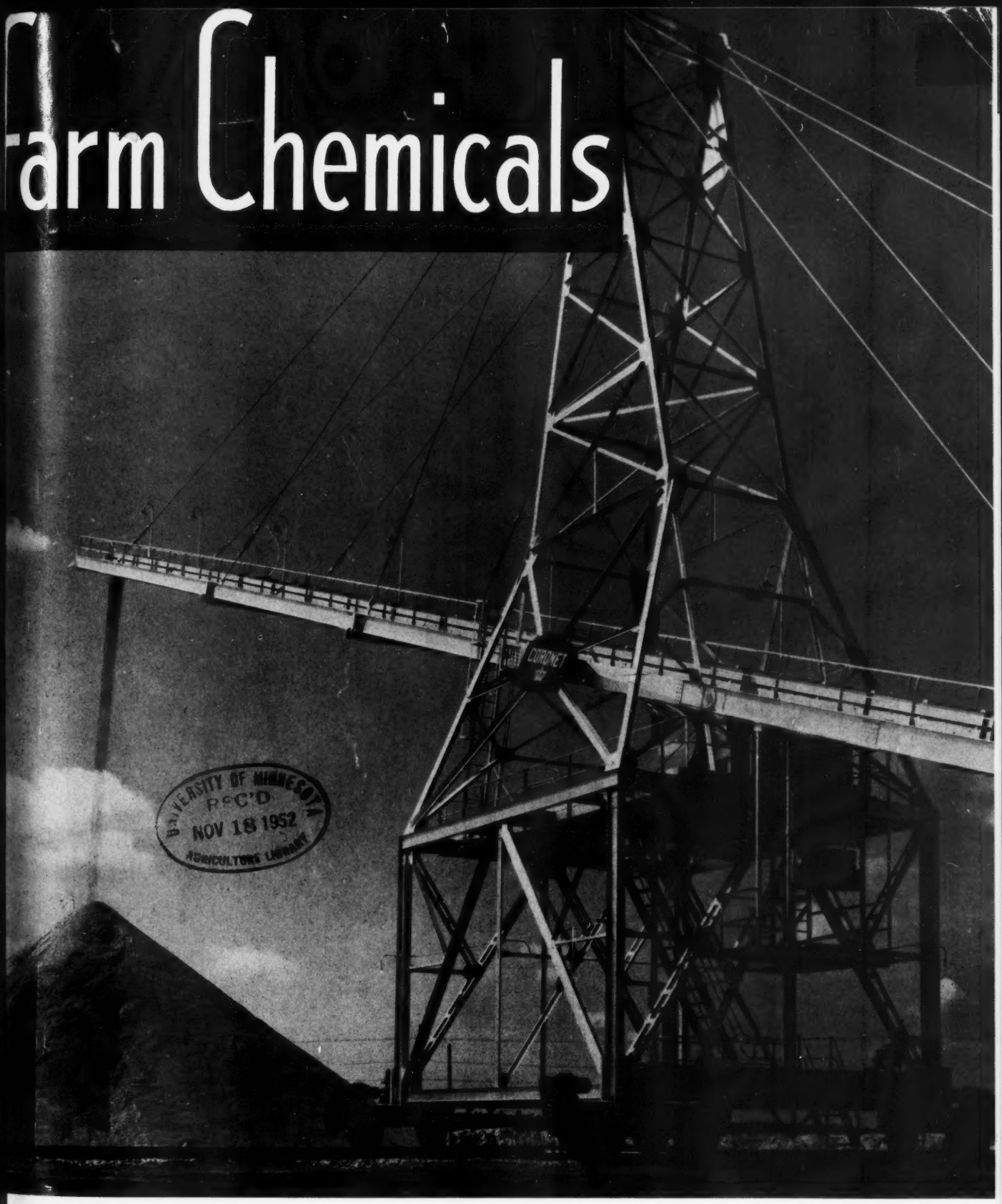
Farm Chemicals



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HUDSON ENLARGES GUARANTEE ON MULTIWALL SACKS: NOW COVERS DAMAGE ON PACKER

Will replace without cost any Hudson Multiwall Sack broken on packing or closing machines

NEW YORK CITY. The Hudson Pulp & Paper Corp. has announced the terms of an unusual new guarantee to purchasers of Multiwall Sacks. In the first such guarantee in Multiwall Sack history, the company binds itself to replace any Hudson Multiwall Sack which bursts, tears, splits, or otherwise fails in the course of packing or closing. Hudson emphasizes that this new guarantee is in addition to their usual warranties of quality and workmanship implicit in every contract.

A typical scene showing Multiwall Sacks being filled and closed. Now, for the first time, a Multiwall Sack manufacturer is guaranteeing to replace any sacks broken during such operations.

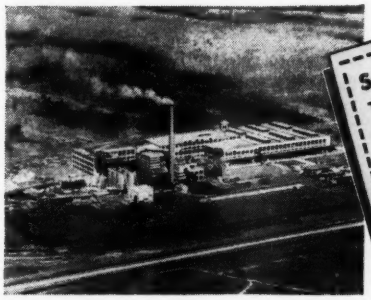
Multiwall Sack Users urged to investigate this offer

The new Hudson guarantee plan went into effect with all sacks purchased on or after Sept. 15, 1952. Multiwall Sack buyers who have learned of this new plan have hailed it as one of the most important developments in years.

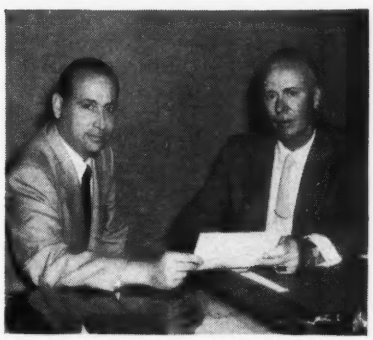
Full information regarding the scope and benefits of the guarantee is being sent, without obligation, to all Multiwall Sack buyers who request it.

Integrated Hudson mill assures delivery

Hudson Multiwall Sack contracts are backed up by a fully integrated new mill at Palatka, Florida. Because every step of manufacture is under one control, Hudson is certain all sacks are made to your exact specifications, and are shipped when they are promised!



Though Hudson's Palatka mill is new, Hudson has 42 years of paper making experience.



T. H. Mittendorf (right), Hudson Vice President in Charge of Sales, and J. B. Mendelsohn, Multiwall Sack Sales Manager, look over the first printed copy of the company's unusual guarantee on Multiwall Sacks.

World's most fully guaranteed Multiwall Sack

Hudson has such faith in the quality of its Multiwall Sacks that it gives the world's fullest guarantee on their performance. While other companies warrant their sacks only against abnormal breakage, Hudson guarantees that *all* its sacks must successfully pass *all* filling and closing operations, or be replaced without further cost.

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2. NITROGEN SOLUTIONS . . . there are three Phillips *66* Nitrogen Solutions for use in the preparation of high-analysis fertilizers and the ammoniation of super-phosphate. These solutions keep handling costs low . . . promote rapid, thorough curing.

3. ANHYDROUS AMMONIA . . . Phillips *66* Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.

4. AMMONIUM NITRATE (see photograph and description above).

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In this issue . . .

Last June the news about Systox, first true systemic pesticide ever approved for use in the United States, fell like a bombshell in the industry. FARM CHEMICALS was first in the industry with the news about the unique pesticide and its possible uses. Now we report on one phase of the testing being done with the chemical—as a systemic nematocide to combat root knot caused by the microscopic eelworms. For results of the experiments, turn to page 12.

Fertilizer supply up in 1953 . . . that's the highlight of the Production and Marketing Administration report on the fertilizer situation for 1952–53, recently released by the U.S.D.A. division. Available will be 12 per cent more NPK than the record supply of the previous year, the report states. For complete details, see the report on page 15.

The war against the insects wasn't concluded successfully several years ago with development of deadly organic pesticides—not by a long shot. The bugs set up strange defense to pesticides by becoming immune to them. Now a promising approach to the problem of insect resistance has been made by three chemists. Read about their tests on mosquitoes with DDT on page 23.

Three days in balmy Florida just when winter is coming in. That's what members of the National Fertilizer Association can look forward to Nov. 19–21 at the Roney Plaza Hotel, Miami Beach. Another attendance record will be broken by the association, according to advance registration figures from N.F.A. for the annual fall convention. See story, page 28.

Research, and the important part it plays in the chemical industry, is featured in the second article of the FARM CHEMICALS series on companies in the expanding industry. Read about Chapman Chemical Co. on page 30.

Soil conditioners, pesticide-fertilizer mixtures. custom fertilizers . . . all came under discussion at the annual meeting of the Association of American Fertilizer Control Officials in Washington, Oct. 3. Personnel in the fertilizer and pesticide industries should be interested in the meeting, which is reported on page 33. For news of the meeting of the Association of Economic Poisons Control Officials, see page 57.

The second group of abstracts of fertilizer and pesticide papers, presented at the recent meeting of the American Chemical Society appear on page 37.

How the Wage and Hour Law applies to the fertilizer and pesticide industries is told in an interesting and informative article by the U. S. Department of Labor on page 47.

farm chemicals

Formerly
American Fertilizer & Allied Chemicals
Established 1894
PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 115 **NOVEMBER, 1952** **No. 11**

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Cover Story

High winds which sweep Florida motivated engineers to design the novel travelling stacker for phosphate rock shown on this month's cover. It was built for Coronet Phosphate Co., by Hewitt-Robins, Inc. See story, page 75.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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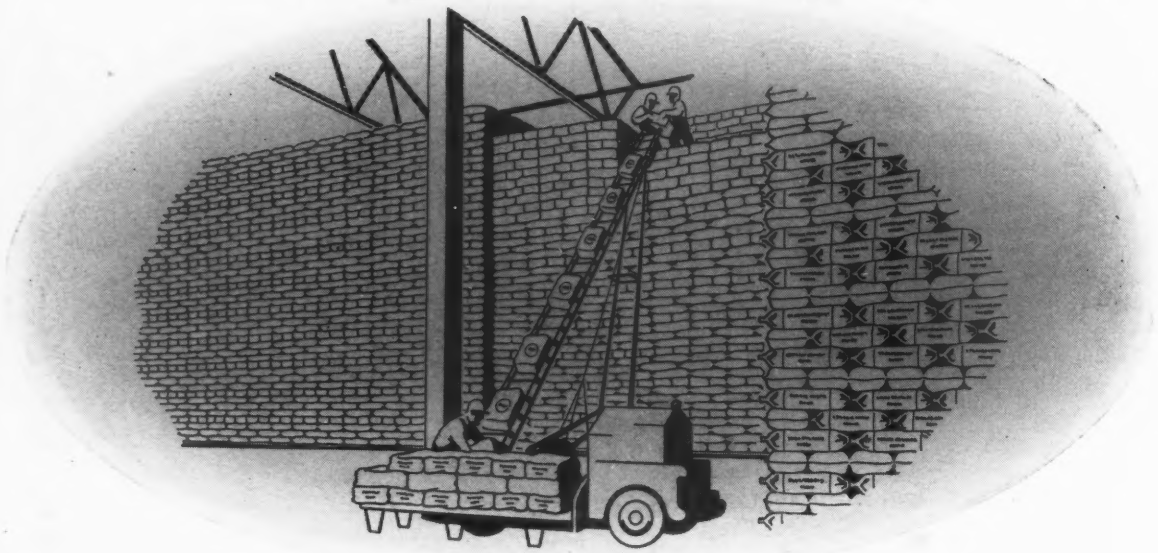
than the products they dependably carry



Yes, a great deal more goes into Hammond Multi-Wall Bags than the hundreds of products that are now safely and dependably shipped in them. Here are a few reasons for Hammond's steady growth and for the steadily increasing demand for these Better Bags:

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farm chemicals facts

. . . Briefly Noted

Vincent Russo has been named general manager of new **John Powell & Co.** insecticide plant in Atlanta. Russo, formerly production manager of Powell's chemical plant in Huntsville, Ala., will supervise operations at the plant, which specializes in DDT, toxaphene and BHC concentrates. The plant is the only one in the Southeast specializing in basic insecticide materials for the independent manufacturer, according to **H. Alvin Smith,** president of the company.

Guerrilla ambushes in Malaya are being prevented by use of herbicide sprays on undergrowth along roads and highways, that country reports. The federal legislative council says a fleet of five spray vehicles kills underbrush which is used to screen movements of the guerrillas.

World's only floating sulfur mining plant is in operation for Freeport Sulphur Co., in the Louisiana bayou country. Cost of building permanent plants for extraction in the marshland was prohibitive so company developed mobile unit which resembles a houseboat. It is towed by a tug.

Herbert H. Handelmann has been named executive vice president of the agricultural specialities division of Drum Chemicals, Inc., Brooklyn.

Died: Isaac Taylor Rhea, 75, president of Mente & Co., Inc., of New Orleans, bag manufacturers. He would have marked the 50th anniversary with Mente and his 55th year in the bag business in 1953.

"No striking results," is the report from Western Massachusetts on small-scale field tests of soil conditioners. Dr. William G. Colby, professor of agronomy at University of Massachusetts, said materials weren't prepared specially for soils like those found in the area so he wasn't surprised by mediocre results.

Radioactive tracers are being used by two University of California professors who are watching plants in the dark to determine how they get food from the soil. The men are Roy Overstreet, soil chemist, and Louis Jacobson, plant biochemist.

Spencer Chemical Co. was host at a dinner for the National Young Farmer Conference Oct. 17 in the Muehleback Hotel, Kansas City, Mo. Principal speaker at the dinner, which followed the national FFA meeting, was Knox Hutchinson, under secretary of agriculture.

Sulfur probably will remain under price controls for some time to come, according to OPS officials. They stated it would be "difficult to justify" decontrol of the chemical at this time.

Dr. H. J. Fisher, of Connecticut Agricultural Experiment Station, was elected president of Association of Official Agricultural Chemists at 66th annual meeting, September 29–October 1, in Shoreham Hotel, Washington, D. C.

O. W. McDuffie will head International Paper Co., Bagpak Division's new sales office in Kansas City, Kan. Address of the new office is 401 Kindelberger Road.

CALENDAR

Nov. 6-7—Pacific Northwest Plant Food Assn., Gearhart, Ore.

Nov. 10-12—Calif. Fert. Assn. convention, Palm Springs, Calif.

Nov. 17—National Joint Committee on Fertilizer Application, meeting with American Society of Agronomy, Cincinnati, Ohio.

Nov. 19-21—NFA fall meeting, Miami Beach, Fla.

Dec. 7-9—Chemical Specialities Mfg. Assn. annual meeting, New York City.

Exclusive distributor for Montansalpeter Ammonium Sulphate Nitrate is H. J. Baker & Bro., New York. The fertilizer material, a double salt containing 26 per cent nitrogen, now is being received in bulk from Germany and is offered in pellet form to the trade in even-weight bags, the company stated.

Stockholders of Dow Chemical approved a three for one split of common stock. They also increased authorized stock from 12 million to 50 million shares. Before the split, Dow had just under seven million shares outstanding.

Chemical Manufacturing Co., Inc. now is located at 444 Madison Avenue, New York 22. The company recently moved into larger quarters from 21 West St. New telephone number is MUrray Hill 8-8700.

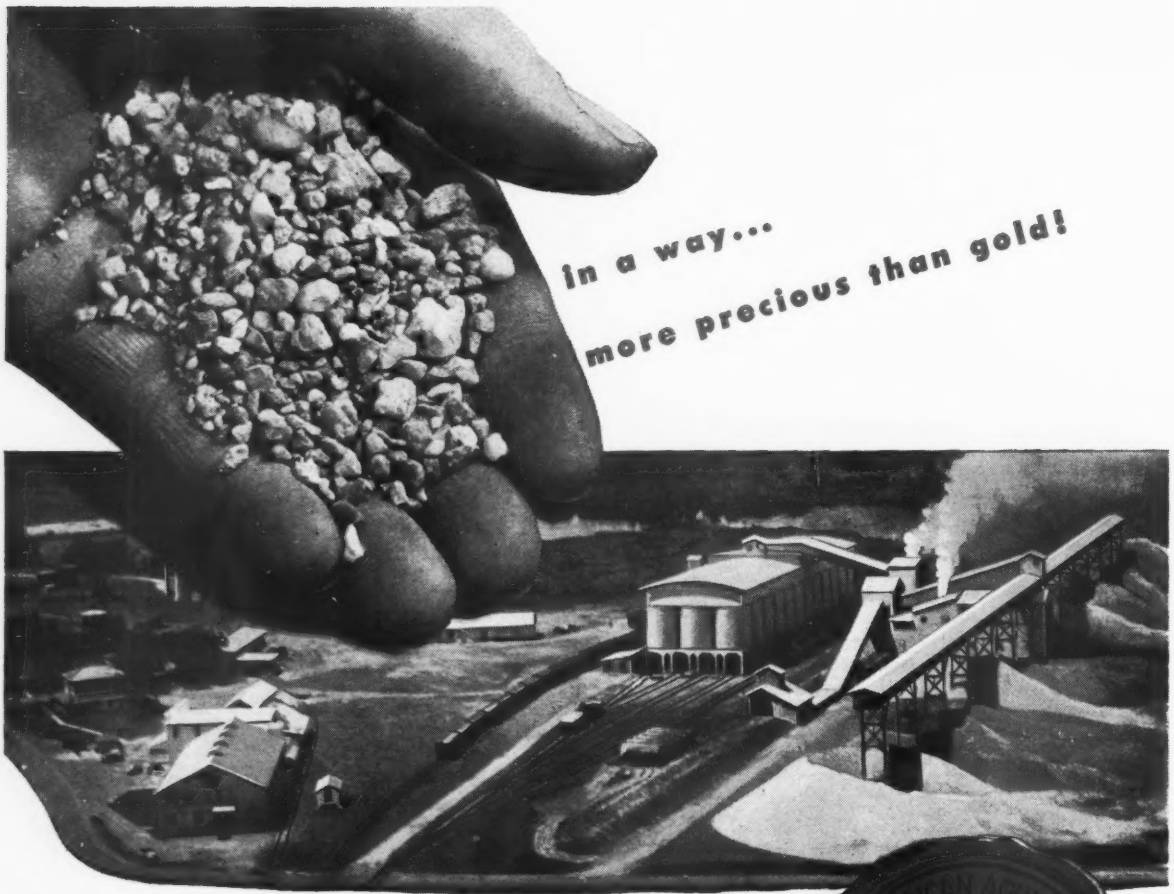
Southwest Fert. & Chem. has received a $312,083 RFC loan to produce 20 per cent super from ground phosphate rock using spent refinery acid.

California Fertilizer Association's offices have been relocated in Suite 1, Boothe Building, 475 Huntington Drive, San Marino 9, Cal.

A foreign department has been organized by Pittsburgh Coke and Chemical to direct all overseas chemical sales operations. The new unit, with headquarters in New York City, will be headed by Robert Kirk, former export manager of McKesson & Robbins chemical division. David H. Hoyer has been named sales director.

Died: Mrs. Posey Blanker Rhea, wife of Isaac T. Rhea, president of Mente & Co., on Sept. 4. Mrs. Rhea had been for many years a vice president and director of the company.

A new method of 2,4,5-T acid synthesis has been developed by Galat Chemical Corp. By making use of Penn Salt's Alpha-Beta Crystals it may help break the now comparatively high production cost.



Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. Q This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.

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for over 85 years a symbol of quality and reliability

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock **AA QUALITY Ground Phosphate Rock**
All grades of Complete Fertilizers **Superphosphate**
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farm chemicals outlook

Report from Washington
by Fred Bailey & John Harms

Are farmers headed for trouble? Many economists inside and out of government think so. Not immediately. Not perhaps until late 1953 or early 1954 . . . but that trouble is ahead becomes more apparent each month to economists we've talked with.

Shaky farm prices are the tip-off. They're not temporary . . . not flash in the pan. Downward trend of farm prices has been in the making for more than a year. National averages are 10 per cent off the early 1951 peak . . . five per cent off the 1951 average. And the trend is to continue, say market watchers. USDA index of farm prices received also is weak.

But farm costs show no sign of losing muscle tone. Economists viewing the agricultural outlook for 1953 predict higher farm prices for most production goods: machinery, trucks, automobiles, implements, feed, fertilizer. Higher labor, material and transportation charges get blame.

Rising costs and falling prices make for bigger farm indebtedness. Rising farm debt gives credit men the jitters. It's tattle-tale grey now . . . foretells of blacker days in next year or so. Farmers now borrow at bigger clip than any time since depression thirties. Borrowing for immediate production needs is up. Next year may be second highest farm borrowing year on record.

Only a big war . . . or crop failure is seen here as factor that could change the current trends.

What all this means to those who sell the farm market: The farmer will tend to be more selective in his buying habits . . . he'll take only those items he thinks will give him most mileage. Competition for the shrinking farm dollar will become razor-sharp.

Fertilizer and pesticides are naturals for farm favor . . . even in this budding cost-pinch era. But. as one farm expert puts it, there is "no substitute for salesmanship—the honest-to-goodness old-time American kind."

Farmers must be shown . . . repeat shown . . . that chemical fertilizer and pesticides are items that he cannot do without if he's striving for greater efficiency in his operation. And greater efficiency now becomes imperative, say farm economists.

Look for increased government pressure for greater production of high-analysis fertilizer. This is considered by USDA as a major cost-saving device to help farmers.

Changes in Insecticide Act regulations . . . to be announced some time in December . . . are not expected to change greatly USDA administration of Act. Generally they will set down in more detail what you can and can't do anyway under the Act. No basic changes are expected.

New proposals: (1) Notification of each registrant by USDA of approaching end of registration period . . . every 5 years. (2) Periodic review of labeling. (3) Require ingredient statement to accompany each economic poison distributed under experimental permit if offered for sale.

NPA believes USDA nitrogen goal for 1955 of 690,000 tons solid material will be

met on basis of industry plans. It also estimates that higher production efficiency could supply estimated requirements needed in the event of war . . . approximately 315,000 tons above the current 1955 goal.

Shutting down of additional DDT, BHC, Toxaphene plants worries food production men. They see current surpluses turning quickly to shortages in the event of a big pest season next year.

Although officials admit there's not much they can do to get farmers to buying, inventories rolling . . . they plan a winter campaign to advise farmers to buy basic needs early and not to "get caught in the rush next spring and summer."

Details on the synthesis of Allethrin . . . USDA insecticide discovery . . . are contained in an exhaustive booklet recently released. Write Bureau of Entomology and Plant Quarantine, USDA, Washington, D. C., for copy of "A Digest of Information on Allethrin."

Government scientists see "great future" for pre-emergence herbicides. USDA has a vast research program working in cooperation with 18 Agricultural Experiment Stations. Major work here is: (1) Screening of chemicals for herbicidal properties and (2) Studies to determine why certain chemicals work, others don't.

General problem of pre-emergence weed-killers is their close relationship to moisture. If there's no rain, no weed control is necessary. If there's too much rain right after application, much of herbicide leaches away. It's a matter of something soluble enough to apply easily . . . yet not too soluble to leach readily.

Government programs to encourage greater use of chemical fertilizer and pesticides are to show no change with the new federal administration. They are tied in closely with programs to increase farm production to new records for many years to come.

The new administration is aware that farm food and fiber output must increase to feed the growing population. While most of the top men in government will leave in January, the men who actually do the work, and the programs, such as price supports, production goals, etc., are to remain—at least for another year.

The fate of production and export controls will be decided in the new Congress . . . Most expire June 30. But intricate plans already are in existence for controllers' fight to retain their powers.

Some controls will be kept, observers here believe. They probably will take the form of military priorities for scarce production items. Export controls on shortage materials such as sulfur also are expected to be retained. But, unless the international situation changes materially, odds favor killing of all price-wage and many production controls by new Congress.

Special Congressional appropriations are to be asked by USDA this winter to help conduct the "fertilizer and lime utilization" program. Program's steering committee, composed of Land Grant College and USDA experts is to meet in early November to figure out what additional money will be needed . . . work out specific details of program.

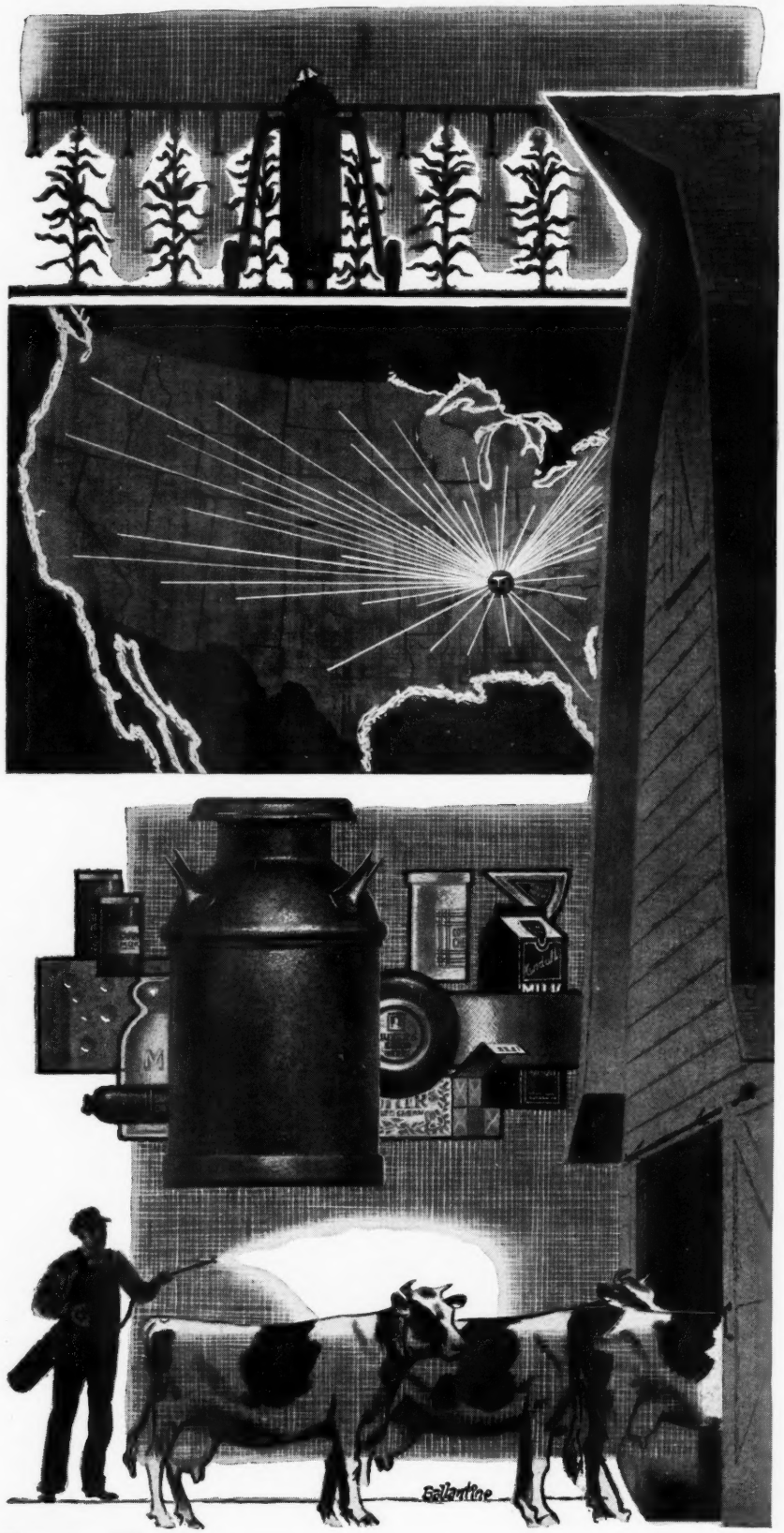
Big tub-thumping campaign already is being worked out to jibe with USDA 1953 production goals program, starting some time in February.

Footnotes to science show that while the farm chemical industry has made great strides in the past 10 years . . . even more spectacular developments are in the offing.

Footnote No. 1: Mixture of lindane and a chlorinated polyphenal produces a substance that retains its power to kill insects at least double length of normal lindane sprays.

Footnote No. 2: Modified 2,4-D weed-killer can be beneficial to crops. 2,4-D kills weeds and some cultivated plants. But by modifying original 2,4-D by combination with certain amino acids it proved beneficial to tomato test plants.

THERE'S A TOUCH OF TENNESSEE IN WISCONSIN DAIRIES



Lindane, the newest high potency insecticide, is putting the biggest bite of all times on insects. In Wisconsin dairy barns, in corn fields, truck gardens and your own back yard, Lindane from TENNESSEE effectively controls more species and types of plant and animal insect pests than any other insecticide ever used.

TENNESSEE also supplies Wisconsin industries with sodium benzoate as a preservative, smoke flavoring for foodstuffs, charcoal and Charkets for industrial uses, ferro alloys and pig iron for farm implements. In fact, TENNESSEE supplies basic materials to industries in all of the 48 states. That's why TENNESSEE is known from Coast to Coast as an industry serving all industry.

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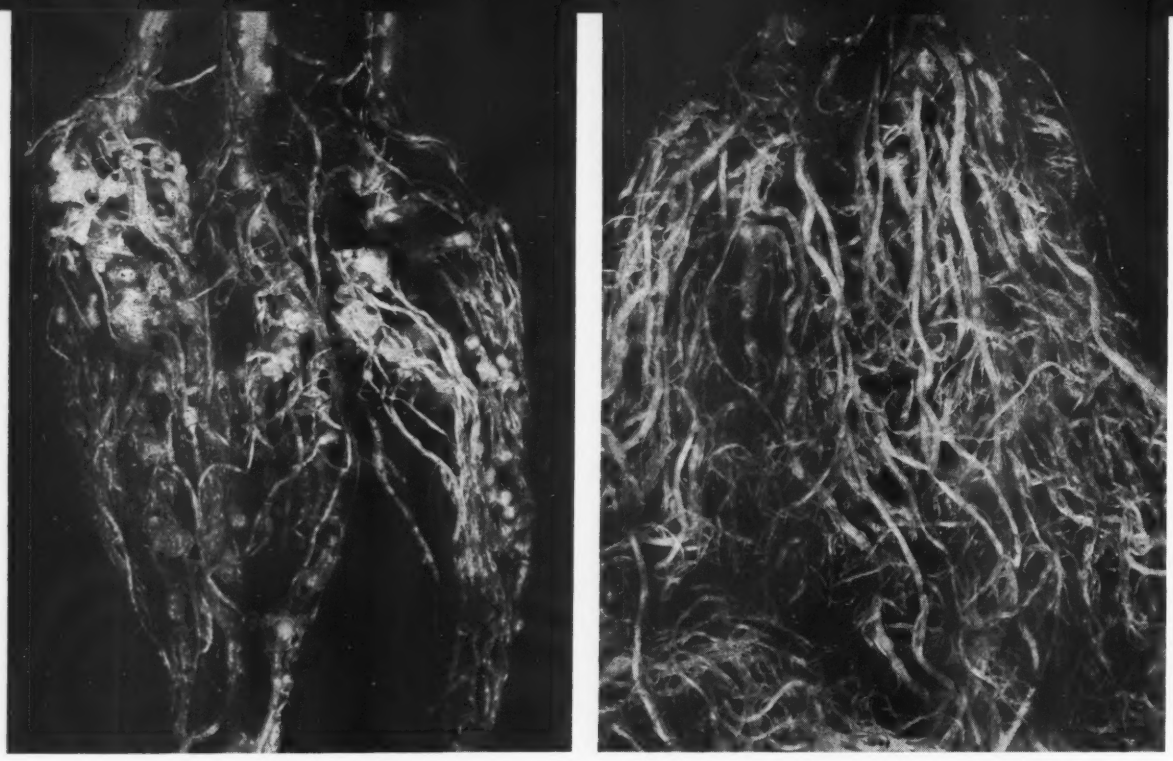


Root-knot infestation is clearly shown in photo at left, showing roots of cucumber seedlings which grew for 31 days in untreated soil. At right, clean uninfected roots grew in soil drenched a week before seeding with one per cent concentration of Systox, new systemic pesticide.

Systox *for control of nematodes*

By J. N. Sasser

Assistant Nematologist, Division of Nematology Investigations, U. S. D. A., Beltsville, Md.

DISEASES caused by plant parasitic nematodes (microscopic eelworms) annually cost American farmers hundreds of millions of dollars. One of the most common of nematode diseases and probably one of the most destructive is known as root knot. It is world-wide in distribution.

Root knot is caused by nematodes of the genus Meloidogyne which enter the roots of susceptible plants and induce the plant to produce "knots" of "galls" on the roots. These galls interfere with absorption of water and mineral elements from the soil by the plant. Severe infections stunt and greatly reduce yield and quality of most of our economic crops.

In recent years chemical companies, in cooperation with the U. S. Department of Agriculture and various state agricultural experiment stations, have developed and tested numerous chemicals for control of nematode diseases. Considerable progress has been made. Several nematocidal soil fumigants now are on the market and some are being used on a commercial scale in several countries.

Fumigants developed to date, however, are limited in use against nematodes because they are poisonous to plants and can be applied only to soils in which no crops are growing. They are volatile and usually are applied a few weeks prior to planting to allow time for diffusion from the soil.

Development of nematocides not poisonous to plants which could be used to destroy nematodes already established in plant tissue hence would be a great step forward.

Systox Effective

Systox, one of the organic phosphates, has proven to be an effective systemic insecticide. As such it is applied either by seed soak in transplant water or by foliar spray and is taken up by the plant. Plants treated in this manner usually remain free of certain insects for several months.

Similar tests with Systox were conducted to determine whether it would act also as a systemic nematocide by preventing treated plants from becoming infected and by destroying nematodes which were already established in plant tissue. Experiments to date, however, have not indicated that Systox is effective as a systemic nematocide. On the other hand, soils drenched

The organic phosphate used in these tests was supplied by Geary Chemical Corporation, New York and is marketed under the trade name Systox. Systox is principally the diethoxythiophosphoric acid ester of 2-ethyl mercaptoethanol.

Fig. 2, at left, shows relative size of cucumber seedlings after 14 days in treated and untreated soil. Fig. 3, at right, shows relative toxicity to seedlings after 14 days growth in soil drenched at higher Systox concentrations.

with this chemical have shown nematocidal action. Following is a summary of experiments conducted with Systox, both as a systemic nematocide and soil drench.

Preliminary Tests

Systox was first used experimentally for nematode control in the summer of 1950 at the Nematode Research Laboratory at Hicksville, Long Island, N. Y. Efforts were directed toward control of both the root-knot nematode and the golden nematode of potatoes.

In experiments against the golden nematode, Systox was applied (a) as a tuber soak, (b) as a foliar spray, and (c) as a soil drench. All treatments were ineffective in controlling this pest.

In tests against root-knot, Systox was applied as a drench only to soil infested with root-knot nematodes. In these tests, tomato seedlings planted in treated soil remained free of root-knot while untreated controls were severely galled.

Further Tests

In the summer of 1951 additional tests were conducted in the greenhouses of the Division of Nematology at Beltsville, Md. Soil heavily infested with one of the root-knot nematodes was drenched with concentrations of Systox, ranging from .05 to .5 per cent active ingredient, at the rate of 300 ml. per 5-in. pot. One week later cucumber seeds were sown in these pots and allowed to grow 31 days. Growth measurements of height of cucumber seedlings were taken at 6, 14 and 22 days after planting. Leaf area measurements were taken at 14, 18 and 22 days after planting.

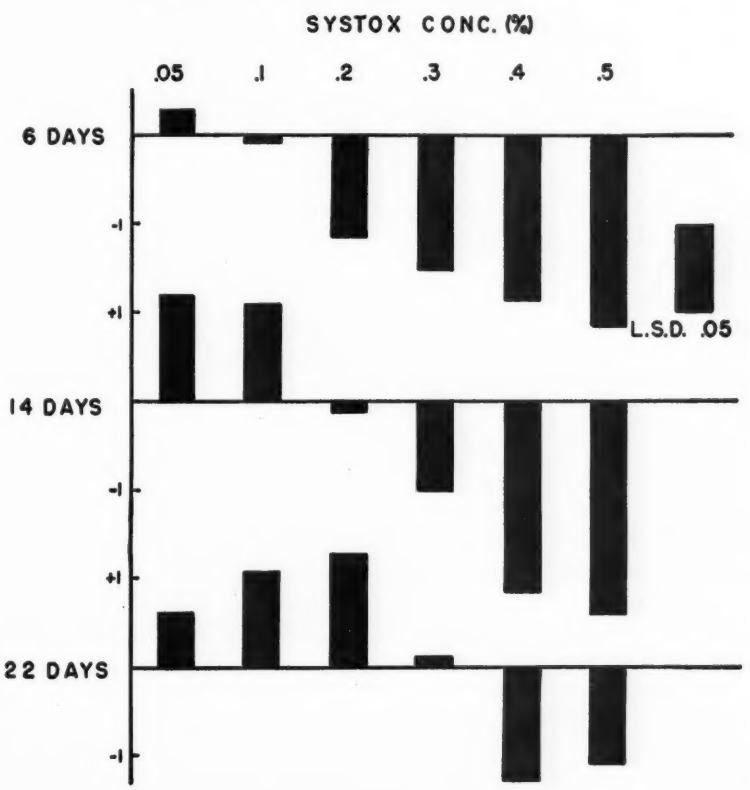
Figure 1 shows differences in growth as measured by height of seedlings grown in root-knot infested soil drenched with different concentrations of Systox. Measurements are in inches above or below that of the controls for each of three growing periods. In general it can be seen that there was little difference in growth between plants growing in treated and untreated soil until after approximately two weeks.

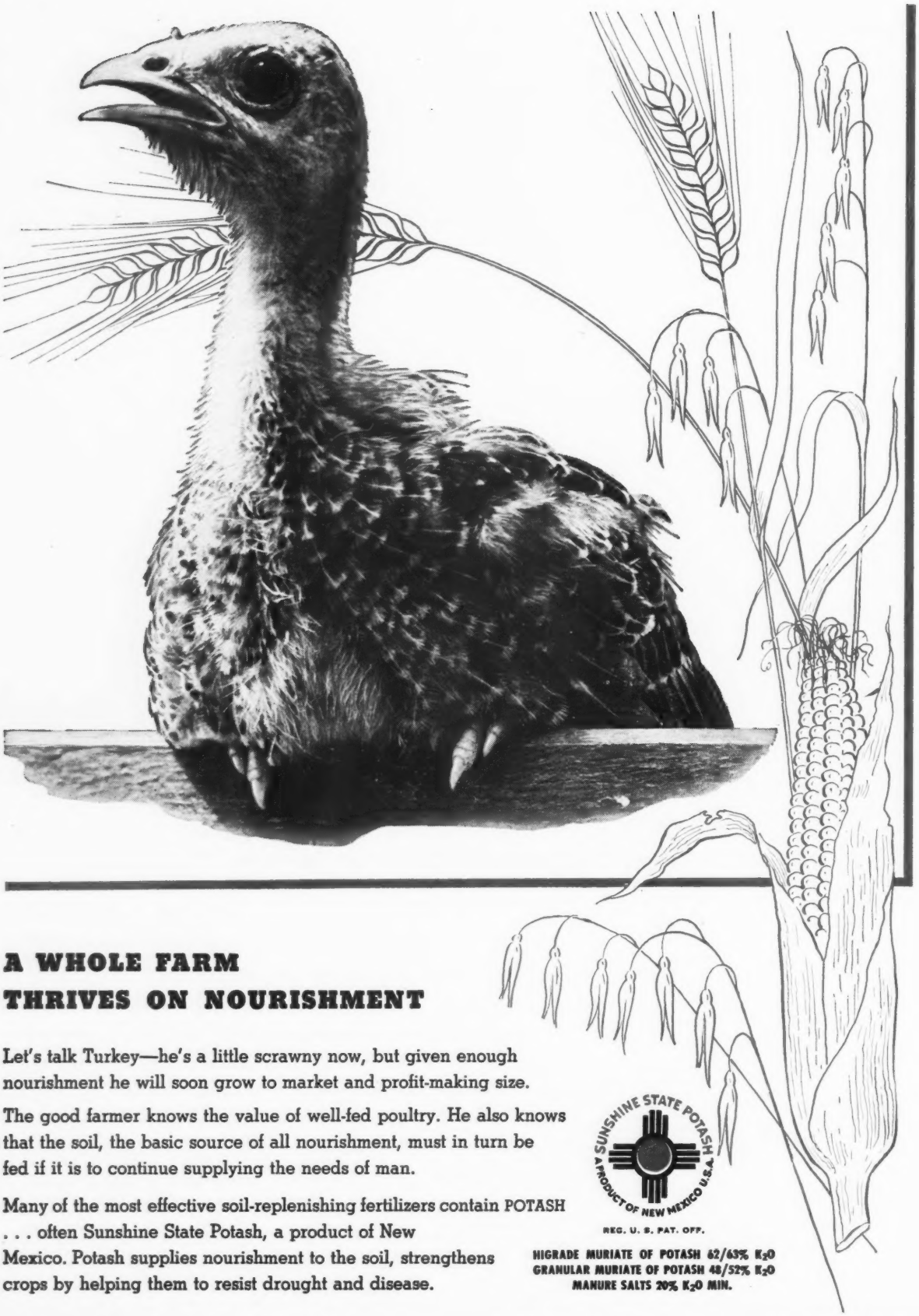
At the end of this period seedlings which had grown in soil treated at the .05 and .1 per cent Systox concentration had made significantly better growth than the controls. Higher concentrations depressed growth especially for the first two weeks. Figures 2 and 3 show relative size of cucumber seedlings after 14 days' growth in soil drenched at various concentrations. In Figure 3 the apparent stunting of those seedlings which grew in soil treated at the .2 per cent concentration and above may be noted.

After 31 days' growth an examination of roots of the cucumber seedlings from the different treatments revealed that check plants were severely galled. Seedlings which had grown in soil drenched with .05 per cent Systox concentration were lightly infected while those from soil drenched with a .1 per cent concentration and above showed no signs of root-knot in-

(Continued on page 69)

Fig. 1. Height of cucumber seedlings grown in root-knot infested soil drenched with concentrations of Systox. Differences in inches shown above or below the height of the controls.





A WHOLE FARM THRIVES ON NOURISHMENT

Let's talk Turkey—he's a little scrawny now, but given enough nourishment he will soon grow to market and profit-making size.

The good farmer knows the value of well-fed poultry. He also knows that the soil, the basic source of all nourishment, must in turn be fed if it is to continue supplying the needs of man.

Many of the most effective soil-replenishing fertilizers contain POTASH . . . often Sunshine State Potash, a product of New Mexico. Potash supplies nourishment to the soil, strengthens crops by helping them to resist drought and disease.

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A PRODUCT OF NEW MEXICO U.S.A.

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GRANULAR MURIATE OF POTASH 48/52% K_2O
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PMA issues report, with a forecast, on

Fertilizer Situation for 1952-53

MORE NITROGEN, phosphates and potash will be available next year than was available during the 1951–52 year, members of the USDA's Fertilizer Industry Advisory Committee were told at a recent meeting in Washington.

The committee, meeting to discuss industry problems and the general outlook for fertilizer, learned that total supplies of the three primary fertilizer elements will be up 12 per cent for the 1953 crop year.

Outlook includes an 11 per cent rise for nitrogen, 10 per cent for phosphates and 17 per cent for potash. In spite of the increased production of nitrogen for the coming season, however, industry representatives predicted that supplies of the chemical still will be short. Phosphates should be nearly adequate in 1953 and potash should be sufficient for all requirements, the spokesmen stated.

PMA Report

Complete text of a Production and Marketing Administration report entitled "The Fertilizer Situation of 1952–1953," giving details of the expected increases in production of fertilizers follows:

In the light of information at hand regarding domestic production and assuming usual import-export balances, it is estimated that the aggregate 1952–53 supply of the three primary plant nutrients will exceed by some 12 per cent the record amount available for use in 1951–52.

FARM CHEMICALS *presents herewith complete text of the recently issued Production and Marketing Administration report on the fertilizer situation for 1952–53. PMA intends to issue a supplemental report in January, 1953, which this magazine will present for its readers.*

NITROGEN Based on current information as to when a number of new synthetic ammonia plants are expected to be completed, making allowance for some increased production at by-product plants and assuming about the same import-export balance as in 1951–52, the 1952–53 available supply is presently estimated at 1.585 million tons of nitrogen, representing an increase of slightly more than 11 per cent above the reported 1951–52 supply of 1.425 million tons.

Details of the 1952–53 forecast for nitrogen by type and class of material are shown in Table 1. For comparison purposes details of the 1951–52 nitrogen supply, as reported, are shown in Table 1-A.

It will be noted that the forecasted supply of solid nitrogen materials (dry nitrogen) in 1952–53 represents approximately 62 per cent of the total supply, and solutions and liquid materials (wet nitrogen) 38 per cent. For the previous year these percentages were approximately 65 and 35 respectively.

PHOSPHATES The producers of superphosphates and related phosphatic fertilizer materials were able to overcome some of their sulfur and sulfuric acid problems during the 12 months to June 30, 1952, with the result that production was better than anticipated. Assuming some continued improvement and the availability of new sources of sulfuric acid, the supply of available phosphates for 1952–53 is forecast now at 2.465 million tons, available phosphoric oxide (P_2O_5) basis, as set out in Table 2. An additional 300 to 350 thousand tons of total phosphoric oxide can be expected in the form of P_2O_5 content of ground phosphate rock and similar materials.

The 1952–53 forecasted supply of available phosphoric oxide is about 10 per cent above the 2.235 million tons which were put into domestic trade channels in 1951–52, according to data now available. Details of the 1951–52 supply are shown in Table 2-A.

POTASH The 1952–53 supply of potash (K_2O) for fertilizer purposes will reflect production of new facilities plus incremental increases of older operations. It is possible that some increase in imports might occur. Exports are expected to show some increase. Taking these factors into account, a 1952–53 sup-

ply of 1.850 million tons of potash (K_2O) is forecast. This amount is about 17 per cent above the reported 1951–52 supply of 1.585 million tons. Details are shown in Tables 3 and 3-A respectively.

Fertilizer Expansion Program

In order to meet desired levels of crop production in 1954–55, it has been estimated that there will be needed for domestic fertilizer purposes 2.185 million tons of nitrogen, 3.485 million tons of available phosphoric oxide and 2.185 million tons of potash. Quantities represent increased production respectively of approximately 900 thousand tons of N, 1.3 million tons of P_2O_5 and 740 thousand tons of K_2O over the 1950–51 domestic supply for fertilizer purposes.

NITROGEN The estimated nitrogen requirements of the Department of Agri-

Table 1—NITROGEN: Estimated 1952-53 supply for fertilizer purposes, United States and Possessions
In Tons of 2,000 Pounds Nitrogen (N)

Source	Ammonium Nitrate[1]	Ammonium Sulfate[2]	Other Solids[3]	Natural Organics[4]	N Solutions Compound[5]	NH_3 for Ammoniation[5]	NH_3 for Direct Application[6]	Total by Source
U. S. Production								
Synthetic ammonia	275,000	140,000	120,000	—	330,000	35,000	250,000	1,150,000
By-product ammonia	—	178,000	—	—	—	2,000	—	180,000
Natural organics	—	—	—	35,000	—	—	—	35,000
Total	275,000	318,000	120,000	35,000	330,000	37,000	250,000	1,365,000
Exports	2,000	42,000	20,000	1,000	20,000	—	—	85,000
Net domestic production	273,000	276,000	100,000	34,000	310,000	37,000	250,000	1,280,000
Imports	110,000	40,000	150,000	5,000	—	—	—	305,000
Total supply U. S. and possessions	383,000	316,000	250,000	39,000	310,000	37,000	250,000	1,585,000

For the purpose of this tabulation the following groupings have been made:
[1]Includes estimated ammonium nitrate, fertilizer grade, ammonium-nitrate limestone mixtures, and ammonium sulfate-nitrate.
[2]Includes estimated ammonium sulfate content of imported and exported mixed fertilizers.
[3]Includes estimated ammonium phosphates, sodium nitrate, urea mixtures, calcium nitrate and cyanamid.
[4]Estimated nitrogen content of natural organics used in commercial fertilizer.
[5]Includes estimated nitrogen content derived from solutions and ammonia in exported ammoniated superphosphates and mixed fertilizers.
[6]Includes compound nitrogen solutions and ammonium nitrate solutions used for this purpose.

Table 1-A—NITROGEN: 1951-52 Supply for Fertilizer Purposes, United States and Possessions (Trade Delivery Basis)
In Tons of 2,000 Pounds Nitrogen

Source	Ammonium Nitrate[2]	Ammonium Sulfate[4]	Other Solids[5]	Natural Organics[6]	N Solutions Compound[7]	NH_3 for Ammoniation[7]	NH_3 for Direct Application[8]	Total by Source
U. S. Production								
Synthetic ammonia[1]	246,000	131,000	106,000	—	317,000	33,000	171,000[9]	1,004,000
By-product ammonia[2]	—	166,000	—	—	—	2,000	—	168,000
Natural organics	—	—	—	36,000	—	—	—	36,000
Total	246,000	297,000	106,000	36,000	317,000	35,000	171,000	1,208,000
Exports[1]	1,000	36,000	18,000	1,000	17,000[10]	—	—	73,000
Domestic deliveries, U. S. sources	245,000	261,000	88,000	35,000	300,000	35,000	171,000	1,135,000
Imports[1]	110,000	41,000	134,000	5,000	—	—	—	290,000
Total supply, U. S. and possessions	355,000	302,000	222,000	40,000	300,000	35,000	171,000	1,425,000

[1]Based on special reports from industry components and Bureau of the Census data.
[2]Based on reports of the Bureau of Mines and information from industry components.
Principally to prevent disclosure of individual company operations the following groupings have been made:
[3]Includes ammonium nitrate, fertilizer grade, ammonium-nitrate limestone mixtures and ammonium sulfate-nitrate.
[4]Includes estimated ammonium sulfate content of imported and exported mixed fertilizers.
[5]Includes ammonium phosphates, sodium nitrate, urea mixtures, calcium nitrate and cyanamid.
[6]Estimated nitrogen content of natural organics used in commercial fertilizers.
[7]Includes estimated nitrogen content derived from solutions and ammonia in exported ammoniated superphosphates and mixed fertilizers.
[8]Includes compound nitrogen solutions and ammonium nitrate solutions used for this purpose.
[9]Includes small amount of by-produc-ammonia.
[10]Includes small amount of NH_3 for ammoniation.

culture for fertilizer purposes and the estimates of the National Production Authority for industrial and military requirements by 1955 were incorporated into the Defense Production Administration's Expansion Goal Number 9. The program called for approximately 1.3 million tons of added nitrogen capacity by 1955 over the installed capacity of 1.639 million tons as of January 1, 1951.

Applicants for necessity certificates and CMP-4C construction permits have advised NPA that they proposed to supply approximately 900,000 tons of nitrogen as nitrogenous fertilizers in the form of anhydrous ammonia or as solid compounds, such as ammonium or sodium nitrates, ammonium nitrate-limestone mixtures, ammonium sulfate, ammonium phosphates and urea. This expansion program progressed through three stages.

First Stage

The first stage provided 244,000 annual tons without the incentive of accelerated tax amortization. This step included the rehabilitation of the Morgantown Ordnance Works, some increase at the TVA plant and expansion at four privately owned facilities. This part of the program is about completed, except for one plant which is due in January, 1953.

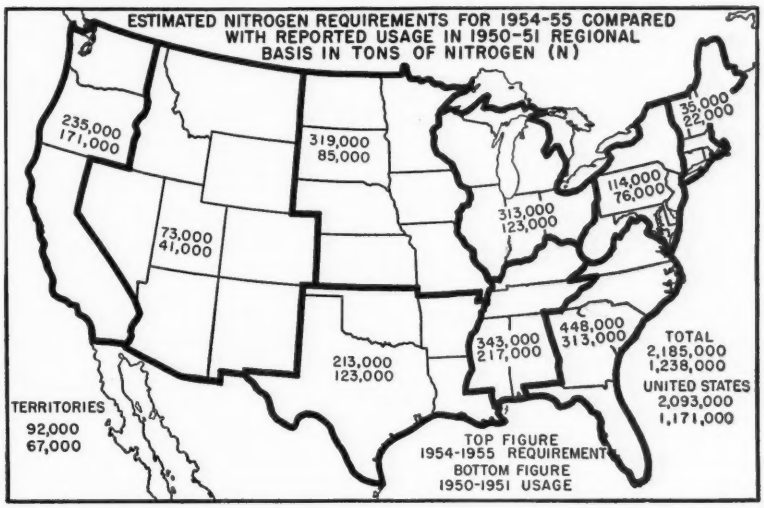
In the second stage certificates of necessity were granted to 13 plants having a combined annual capacity of 556,000 tons of nitrogen. Four of these plants with a total capacity of 88,000 tons were completed and in operation prior to the beginning of the 1952–53 fertilizer season. Nine plants with a capacity of 469 thousand tons annually are to be completed. Two are scheduled for operation during 1952–53; the other seven are not expected to be completed until the 1953–54 season.

Nitrogen Capacity

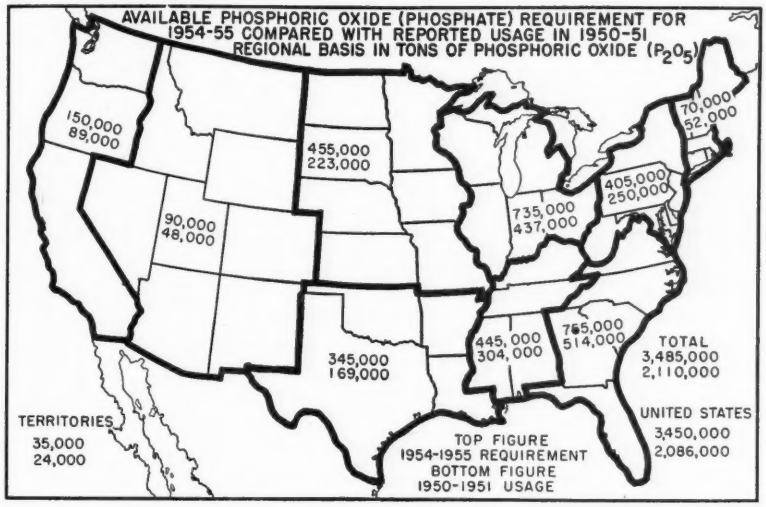
Third stage included 12 plants with an annual capacity of approximately 500,000 tons of nitrogen. Two of these are expected to be in operation for a part of 1952–53; the others are planned to come in during 1953–54.

There have been some drop-outs

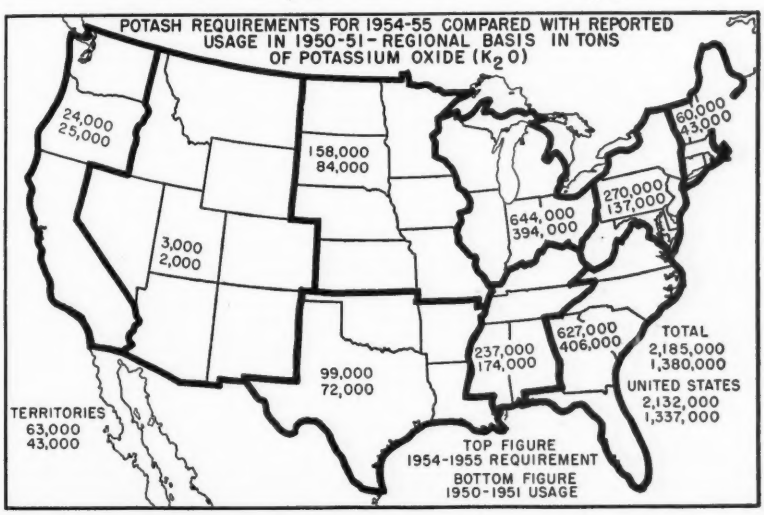
Nitrogen Requirement — Usage



Phosphate Requirement — Usage



Potash Requirement — Usage



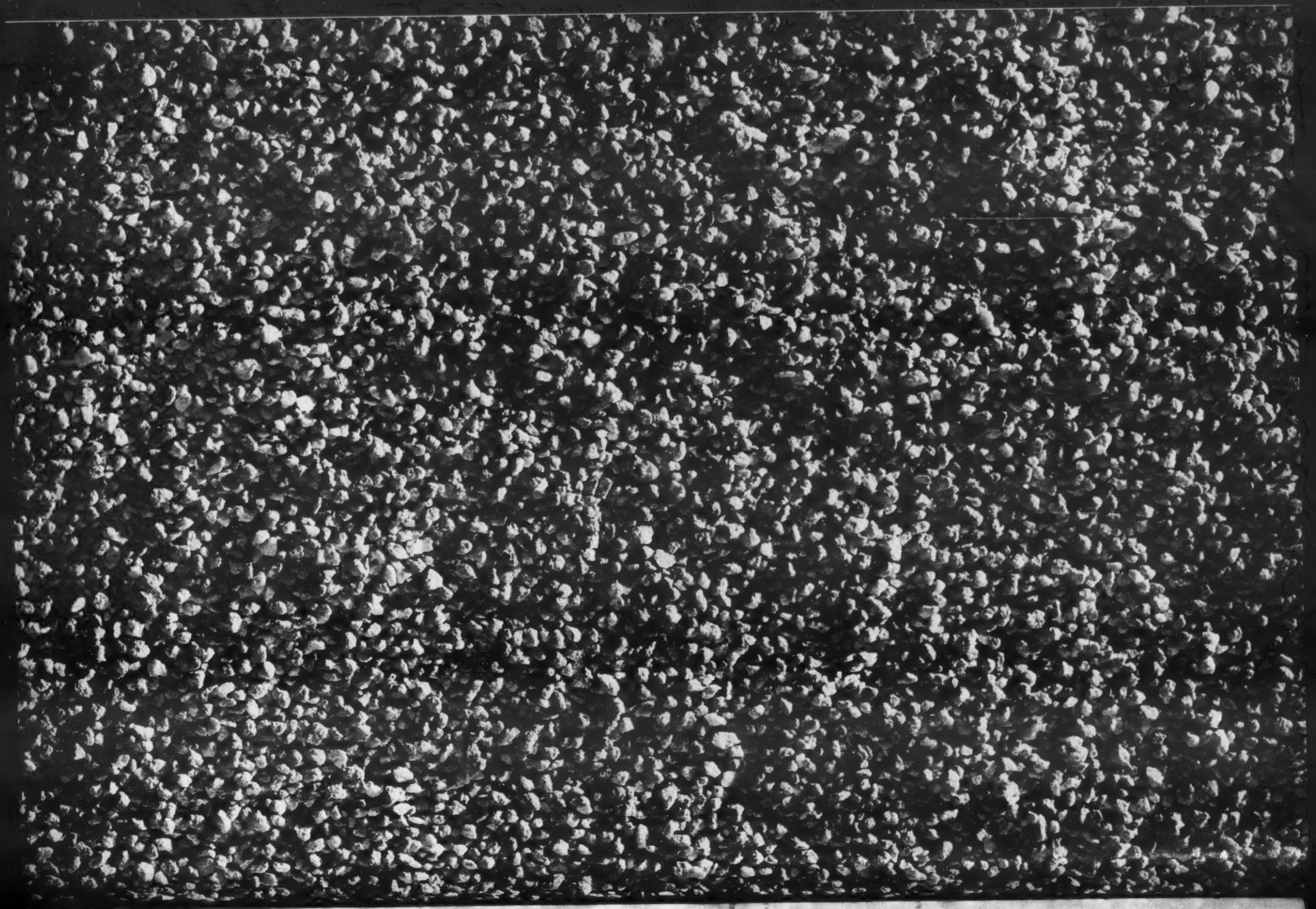


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Table 2—PHOSPHATE: Estimated 1952-53 Supply for Fertilizer Purposes, United States and Possessions

In Tons of 2,000 Pounds Available Phosphoric Oxide (P_2O_5)

Source	Normal Superphosphate	Concentrated Superphosphate	Wet-base Goods	Other[1]	Total by Source
U. S. Production	1,788,000	510,000	16,000	206,000	2,520,000
Exports	66,000	11,000	—	18,000[2]	95,000
Net supply, U. S. production	1,722,000	499,000	16,000	188,000	2,425,000
Imports	1,000[3]	—	—	39,000[2]	40,000
Total supply, U. S. and possessions	1,723,000	499,000	16,000	227,000	2,465,000

[1]Includes estimates for complex phosphatic materials.
[2]Includes P_2O_5 content of prepared phosphatic mixtures, ammonium phosphate and ammoniated superphosphates.
[3]Includes small quantity of concentrated superphosphates.

Table 2A—PHOSPHATE: 1951-52 Supply for Fertilizer Purposes, United States and Possessions (Trade Delivery Basis)

In Tons of 2,000 Pounds Available Phosphoric Oxide (P_2O_5)

Source	Normal Superphosphate	Concentrated Superphosphate	Wet-base Goods	Other[1]	Total by Source
U. S. production	1,745,000	334,000	15,000	196,000	2,290,000
Exports	65,000	11,000	—	18,000[2]	94,000
Net supply, U. S. production	1,680,000	323,000	15,000	178,000	2,196,000
Imports	1,000[3]	—	—	38,000[2]	39,000
Total supply, U. S. and possessions	1,681,000	323,000	15,000	216,000	2,235,000

[1]Includes estimates for complex phosphatic materials.
[2]Includes P_2O_5 content of prepared phosphatic mixtures, ammonium phosphates, and ammoniated superphosphates.
[3]Includes small quantity of concentrated superphosphates.

in the program, but these were promptly replaced by other applicants. It is possible that some of the plants for which certificates were granted will not be built. In view of the interest in this field it is believed that new or revived applicants of other companies will be offered in replacement and that the nitrogen expansion goal will be achieved.

PHOSPHATES The Defense Production Administration Expansion Goal No. 149-A, Phosphate Fertilizer, issued August 5, 1952, calls for domestic production by July 1, 1954 of 3.550 million tons of phosphoric oxide. An increase in production of 1.400 million tons P_2O_5 over that for FY-1951 will be required to meet this goal. This includes 1.300 million tons estimated as required for domestic use and 100,000 tons for export.

Because the phosphate expansion goal has only recently been formalized, and to the uncertainty which surrounds the sulfur-sulfuric acid supply picture, no attempt is being made at this time to indicate prospective phosphate supplies beyond 1952–53. Increases can be expected in 1953–54 and 1954–55 and achievement of the goal of 3.485 million tons (P_2O_5 basis) is believed to be a possibility.

PHOSPHATE ROCK Defense Production Administration Expansion Goal No. 138, issued July 15, 1952 set an interim goal of 5,000,000 long tons of P_2O_5 (content basis) by July 1, 1954. This target is roughly 15,000,000 long tons of phosphate rock.

The goal represents an increase of 1.5 million long tons of P_2O_5 (content basis) over the 1950–51 production of 3.5 million long tons. The expansion needed is to be reexamined during the Fall in the light of prospective sulfuric acid availabilities.

Several applications for necessity certificates covering new plants or expansions have been filed with Defense Materials Procurement Agency by phosphate rock producers. It is intended that implementation of the phosphate rock expansion program will be coordinated with the phosphatic fertilizer program.

POTASH A goal for domestic production of potash at an annual capacity of 2,000,000 tons K_2O basis of July 1, 1954 was set by Defense Production Administration Expansion Goal No. 141, dated July 22, 1952.

This quantity represents an expansion of 600,000 tons over the January 1, 1951 capacity of approximately 1.4 million tons.

New Companies

Two new companies have entered the Carlsbad field, increasing the number of major operators to six, one of which is located in California. In addition there is some production in Utah and in Michi-

Table 3—POTASH: Estimated 1952-53 Supply for Fertilizer Purposes, United States and Possessions

In Tons of 2,000 Pounds Potassium Oxide (K_2O) Content

Source	Muriate of Potash 60% and 50% Grade	Sulfate of Potash and Sulfate of Potash Magnesia	Manure Salts	Miscellaneous and By-product Materials[1]	Total by Source
Deliveries from U. S. production	1,510,000	99,000	2,000	39,000	1,650,000
Exports	59,000	10,000	—	6,000	75,000
Net supply, U. S. production	1,451,000	89,000	2,000	33,000	1,575,000
Imports	247,000	23,000	—	5,000	275,000
Total supply, U. S. and possessions	1,698,000	112,000	2,000	38,000	1,850,000

[1]Includes potash content of oilseed meal and by-product residues used for fertilizer and calculated potash content of mixed fertilizers, exported and imported.

Table 3-A—POTASH: 1951-52 Supply for Fertilizer Purposes, United States and Possessions (Trade Delivery Basis)

In Tons of 2,000 Pounds Potassium Oxide (K_2O) Content

Source	Muriate of Potash 60% and 50% Grade	Sulfate of Potash and Sulfate of Potash Magnesia	Manure Salts	Miscellaneous and By-product Materials[3]	Total by Source
Deliveries from U. S. production[1]	1,259,000	88,000	2,000	35,000	1,384,000
Exports[2]	51,000	6,000	—	6,000	63,000
Net supply, U. S. production	1,208,000	82,000	2,000	29,000	1,321,000
Imports[2]	238,000	21,000	—	5.000	264,000
Total supply, U. S. and possessions	1,446,000	103,000	2,000	34,000	1,585,000

[1]Based on data supplied by the American Potash Institute.

[2]Calculated from Bureau of the Census reports.

[3]Partly estimated; includes potash content of oilseed meal and by-product residues used for fertilizer and calculated potash content of mixed fertilizers, exported and imported.

gan. One of the new mines near Carlsbad recently started production; the other is expected to start within the next few months.

It appears that domestic capacity to produce potash will be sufficient, plus normal imports, to meet agriculture's stated requirement for 1955 crops.

A National Program for More Efficient Use of Fertilizer and Lime—This program, announced on September 11, 1952, is a joint activity of the USDA and the Land-Grant Colleges and Universities. It is intended to bring about more efficient use of fertilizer and lime as one means of increasing food and fiber production, building up the productivity of the Nation's farm land, and increasing net returns to farmers.

Steering Group

A Steering Committee representing the department and the Land Grant colleges and Universities will serve at the National level in guiding the program.

Within the states and counties leadership will be the responsibility of the Land-Grant Colleges and Universities working with local representatives of other interested state and federal agricultural agencies and private groups.

The National Soil and Fertilizer Research committee will collaborate by encouraging state agricultural workers to interpret and prepare for dissemination, in a form suitable for educational purposes, the available data on crop response to increments of plant nutrients and lime and profitable levels of use under different conditions.

Cooperation Needed

Continuing cooperation of the fertilizer and lime industries and other interests is invited to the end that the activities of such groups will be coordinated with the program. The continued collaboration and participation of the state fertilizer control officials and the Tennessee Valley Authority will contribute substantially to the success of the program. ◆

NPA Asks Early Cut-off For Phosphatic Expansion

Establishment of a Dec. 15, 1952 cut-off date for certificates of necessity in the phosphatic fertilizer expansion program was recommended to the National Production Authority at a meeting of the Phosphatic Fertilizer Industry Advisory Committee in Washington, D. C., Oct. 7.

The cut-off date would apply to certificates for new facilities for normal and concentrated superphosphates for inclusion in the expansion goal for the industry.

Presently indicated facility expansion for the production of various phosphatic fertilizer products would increase the production by 893,000 short tons annually by 1955.

The 1955 expansion goal of 3,600,000 tons calls for an expansion of production amounting to 1,400,000 tons over the 2,200,000 produced in 1951, according to NPA estimates.

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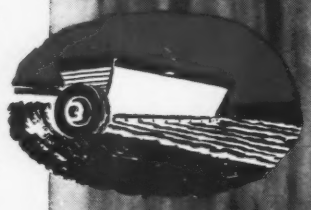

2. APPLICATION CONTROL—drills free and even . . . does not bridge over in the drill.

3. FOOD CONTROL—supplies uniform amount of plant food at desirable rates.

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

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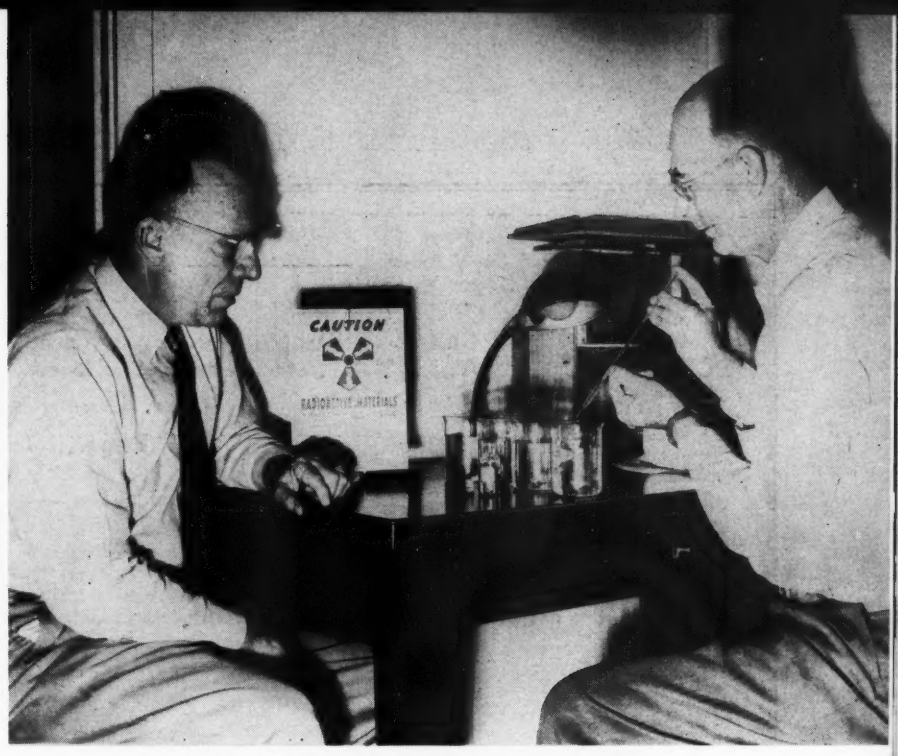
Mosquitoes tested with radioactive DDT to determine



Treating mosquito larvae with radioactive phosphorus are Dr. Joseph S. Butts, left, Oregon State College, and Dr. A. W. Lindquist, entomologist for the U.S.D.A.

Insect Resistance To Pesticides

NO ONE is sure what causes resistance in insects to certain of the newer pesticides. Very few theories have even been ventured on the subject.

Everyone in the pesticide industry knows the problem involved in the immunity of bugs to chemicals which only a few years ago had rapid and deadly effectiveness in controlling them.

The general public was made aware of the problem when it was reported several months ago that DDT was ineffective in controlling body lice on the Korean battlefronts because the insects apparently had developed immunity to the chemical.

Promising Approach

Although the problem remains unsolved, a promising approach to it may have been developed by three research specialists who used radioactive DDT to study absorption and distribution of the toxicant in insects.

The men are C. M. Gjullin and Arthur Lindquist, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, and Joseph S. Butts, of Oregon State College.

Explaining Causes

The men believe that comparing the amount of insecticide absorbed by resistant and nonresistant strains of mosquitoes may be of value in explaining causes of resistance.

The U.S.D.A.'s Bureau of Plant Industry, Soils and Agricultural Engineering, supplied DDT for the experiments. It was made radioactive by substituting radioactive carbon in the benzene used in the manufacture of the insecticide.

Work was done by the scientists at the Oregon Experiment Station, where they measured the radioactivity of larvae and pupae which had absorbed the treated DDT.

One important finding of the experiments is that DDT is more effective against the larvae than the pupae, the scientists reported. Eleven times more DDT was needed to kill pupae than to kill less resistant larvae.

The men stated that previous experiments indicated that mosquitoes from areas treated frequently with DDT had developed resistance to it. Tests with resistant larvae confirmed this idea. They showed that resistant larvae absorbed more than six times as much of the radioactive material as did nonresistant larvae, but 20 per cent fewer resistant larvae were killed by the DDT.

Further proof was given in another phase of the experiments

Table 1.—Absorption of DDT by Mosquito Larvae and Pupae. Exposure 24 Hours.

DOSAGE OF DDT	MORTALITY	LIVING INSECTS			DEAD INSECTS		
		Samples tested	Radioactivity per sample	DDT absorbed per insect	Samples tested	Radioactivity per sample	DDT absorbed per insect
	Per cent	*Number*	*C.p.m.*	*Micrograms*	*Number*	*C.p.m.*	*Micrograms*
Tests with Larvae							
In kerosene solution (micrograms per square inch)							
0.2145	21	9	19	0.00168	4	35	0.00310
.4290	54	3	32	.00283	9	42	.00371
In acetone suspension (p.p.m.)							
0.0125	23	8	18	.00194	3	16	.00173
.0167	88	2	25	.00270	11	20	.00216
.025	97	..	..	.....	7	30	.00324
Tests with Pupae							
In kerosene solution (micrograms per square inch)							
4.935	42	9	38	.0056	4	74	.0109
6.580	66	4	73	.0108	8	176	.0259
In acetone suspension (p.p.m.)							
0.2	14	3	85	.0153	..	..	.....
.5	34	2	63	.0113	1	61	.0110

by the scientists.

When the DDT was used in a lighter dosage, resistant larvae absorbed twice as much as did nonresistant ones, with only 11 per cent mortality, compared with 100 per cent for the nonresistant strains.

In summarizing their work, Gjullin, Lindquist and Butts explained that amounts of radioactive material absorbed by the mosquito larvae and pupae were determined with a commercial type windowless gas flow counter attached to a scaler.

Temperature Important

Dead larvae absorbed approximately two-thirds as much DDT as did live larvae. Temperature also played a part in the effectiveness and absorption of the chemical. Larvae tested in acetone suspensions absorbed nearly twice as much DDT at 90° F. than at 70° and the mortality was lower at 90°.

Bioassay of the extracts of the larvae involved indicated that both resistant and nonresistant larvae had degraded a large amount of the DDT to nontoxic substances.

The matter of degradation was one of the primary considerations of the scientists when they approached the experiments.

Nonresistant Strains

Tests with nonresistant strains were made at 70°, with the insects gathered from eggs in the soil near the Columbia River in Oregon. Preparation of the radioactive DDT was made by substituting C^{14} in the benzene rings in the DDT molecule.

Larvae and pupae were treated with the radioactive chemical in deodorized kerosene or in acetone suspension to determine percentage of kill and to provide specimens in which the amount of absorption could be measured with a flow counter.

From 100 to 300 pupae were used for each test and 300 larvae in all tests except the comparative series at 70° and 90° F., in which 75 were used.

The scientists used an interesting technique in applying the various solutions to the surface of the water. Wire loops were employed to place the kerosene preparations on the water.

A small loop, delivering 0.505 cubic millimeters was used in the tests with larvae and a larger one, delivering 0.742 cubic millimeters in those with pupae. The loops were calibrated by comparing the radioactivity obtained from three loopfuls of the solution with that from three one-cubic millimeter drops of the material delivered by

Table 2.—Absorption of Radioactive DDT by Resistant and Nonresistant Larvae.

DDT	Mortality	50-larva samples	Condition of larvae	Radioactivity per sample	DDT absorbed per larva
p.p.m.	*Per cent*	*Number*		*C.p.m.*	*Microgram*
		Resistant Larvae			
0.2	74	13	Dead	346	0.0345
.1	11	20	Alive	326	.0325
.066	7	20	Alive	205	.0205
		Nonresistant Larvae			
0.1	100	12	Dead	181	.0180
.066	100	18	Dead	123	.01230
.02	94	15	Dead	54	.0054

a 0.25 cubic centimeter syringe operated with a micrometer attachment.

Radioactivity Counts

Mortalities and radioactivity counts from these treatments were determined after 24 hours. The larvae or pupae in the samples either were all alive or all dead. Each sample was washed for 10 to 20 seconds to remove any exterior DDT, allowed to dry, then ground and extracted with acetone. Only after the material was thoroughly dry was radioactivity determined.

Measurable radioactivity was found in larvae treated with both a suspension and a solution of radioactive DDT after 24 hours. It increased as the dosage was increased with both preparations.

Figures given in Tables 1 and 2 are for the amount of radioactive DDT absorbed up to 24 hours and are not the amounts required to kill the species.

One indication gained from the experiments is that DDT is taken into mosquito larvae largely by absorption and that little is ingested. This was ascertained from results which showed that larvae killed with chloroform gas and subjected to acetone suspensions of DDT for 24 hours absorbed approximately two-thirds as much insecticide as did living larvae.

Amount Needed

Some idea of the large amount of insectide required in an oil film as compared with the amount actually used is shown in these tests. A 54 per cent kill was obtained among 300 larvae in an 800-cc. beaker. They were exposed to a DDT-oil film containing 5 μgm. of DDT on 11.78 square inches of surface.

Fifty larvae, which would be a large population for such an area under normal conditions, would use only 0.16 μgm. of DDT, or approximately four per cent of the DDT present in the film.

Eight Tests

In order to determine mortality of larvae and amount of DDT absorbed at different temperatures (70° and 90° F.) eight tests were made by the men. Results obtained were as follows: in a suspension containing 0.0167 μgm. the larvae held at 70° F. averaged 97 per cent mortality with an absorption of 0.0031 μgm. of DDT per larva, whereas those held at 90° averaged 71 per cent mortality and the absorption was 0.0056 μgm. of DDT per larva. The ability of these larvae to absorb nearly twice as much DDT at 90° as at 70° with less mortality is comparable with results obtained on house flies, the scientists reported.

Another interesting phase of the experiments was the methods used by the three men in making bioassays of extracts of treated larvae. To determine whether the absorbed DDT had been degraded to a less toxic substance, extracts of larvae which had been subjected to 0.066 p.p.m. were bioassayed. Ten samples (50 larvae per sample) of resistant and nonresistant larvae on which radioactivity had been determined were prepared for bioassay using highly susceptible larvae.

For these tests each lot was flooded with 3 cc. of acetone to dissolve the toxicant. The debris then was removed by passing the solution through a filter paper. When the filtrate had evaporated the toxicant was re-dissolved with 0.075 cc. of acetone and 10 cc. of water was added.

Mortality Counts

Twenty larvae then were added and mortality counts were made after 24 hours. Based on the radioactivity counts the resistant larvae averaged 1.14 μgm. of DDT or metabolites per sample and the mortality was seven per cent. Average for the nonresistant larvae was 0.74 μgm. per sample but the mortality was 100 per cent.

The scientists said tests with resistant larvae showed degradation apparently played a big part in the dissipation of the DDT. Although original extracts contained 1.14 μgm. of radioactive materials, the bioassay showed only 0.005 μgm. of DDT in the larvae samples. This is a 99.6 per cent loss of toxicity, compared with a 96.6 per cent loss in the nonresistant larvae. Extracts were bioassayed approximately six months after preparation. ◆

CUSTOMERS

H-C (HIGH-COUNT) COTTON

BEMIS DRESS PRINT AND WHITE COTTON

Albert A. Green, President of Jackson Fertilizer Co., Jackson Miss., says:

"We have been highly pleased this year with the pretty white high-count sheeting bags you have supplied us. Our customers like them very much and they were delighted to have these bags with the band-labels that are easy to remove.

We were also pleased with the strength of these high-count sheeting bags as we have had very little trouble with torn bags."

☆ ☆ ☆

T. W. Allen, President of Sand Mountain Fertilizer Company, of Attalla, Alabama, says:

"Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store."

☆ ☆ ☆

E. T. Spidle, General Manager of the Capital Fertilizer Company, Montgomery, Alabama, says:

"These bags proved to be very satisfactory and we expect to use them again next season."

Ask your Bemis Man for the whole story about Bemis H-C Dress Print Bags

LIKE BEMIS FERTILIZER BAGS

SHEETING BAGS BUILD FERTILIZER SALES!

Bemis Dress Print Fertilizer Bags Provide Garments for the Entire Family!

New York Designs Wind Up in Alabama Style Show

Mr. Dallas Greer, who uses Mountain Brand Fertilizer on his farm, poses with his wife and daughter . . . all three are wearing garments made from Bemis H-C print patterns. Pleased customers like the Greers help get still more customers for Mountain Brand.

The experience reported by Mr. T. W. Allen, president of the Sand Mountain Fertilizer Company, of Attalla, Alabama, is typical. He gave a trial-size order for Bemis H-C Dress Print Bags for the well-known Mountain Brand Fertilizer. Sales results were so good that *within three weeks he placed three more orders . . . all very large ones.*

Now, Mr. Allen says, "Any manufacturer would be mighty happy to get the percentage of gain we got. Customers don't mind the slight premium price, because the same high-count cotton fabric would cost them several times as much at the neighborhood store. And those New York-designed Bemis prints certainly please the women."

Bemis

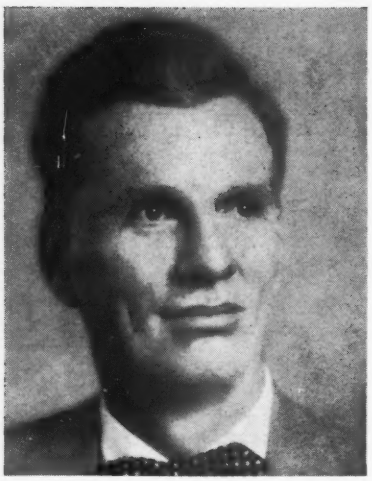
BEMIS BRO BAG COMPANY

General Offices — St. Louis 2, Mo.

Sales Offices in Principal Cities

W. M. Fifield

Dr. Russell Coleman



W. R. Allstetter

Three days at Miami Beach is on the fall schedule as

NFA Heads South

An opportunity to hear important problems of the fertilizer industry discussed by leaders in industry and agriculture, coupled with three balmy days of relaxation at Miami Beach has been offered to members of the National Fertilizer Association. Advance hotel reservations indicate that nearly 800 members will avail themselves of the opportunity.

The occasion, of course, is the NFA's 26th annual fall meeting, to be held at the Roney Plaza Hotel Nov. 19–21. It probably will set all records for attendance in the association's history.

Record Attendance

Last November the then amazing attendance of 500 persons broke the NFA record in the fall convention at Atlanta. That record was eclipsed easily by the 763 delegates who attended the 27th annual convention of the association at the Greenbrier Hotel, White Sulphur Springs, W. Va.

Now NFA staff members expect the attendance figure to jump still higher.

Outstanding Speakers

Beside the natural lure of Florida's warm sands as winter weather approaches, a group of outstanding speakers from government and industry is an attractive feature of the convention.

The get-together also will offer industry personnel an excellent chance to review the year's progress —in attempting to provide more fertilizer for an expanding economy.

Highlights of the program, released in advance by the NFA, include the following:

A talk by W. N. Watmough Jr., vice president of the Mixed Fertilizer Division, Davison Chemical Co., Baltimore, Md. Watmough will discuss the important problem of safety in the fertilizer industry. He is an expert in this facet of the industry, which was discussed in detail at a recent meeting of the fertilizer section of the National Safety Congress in Chicago. The speaker will outline the problems involved in making plants safe, and the advantages in saving time and money which result from a good safety program.

A. H. Moseman

W. N. Watmough Jr.

Warren Garst

"New Foundations for Tomorrow's Agriculture," a talk by A. H. Moseman, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md. Moseman is expected to discuss the ever-increasing expansion of agriculture needed to feed an increasing population, and the role of chemical fertilizers in helping farmers meet national goals.

Role of Bankers

The relationship between bankers and the fertilizer industry will be aired by Warren Garst, executive vice president of the Home State Bank, Jefferson, Ia. The relationship is an increasingly important one, in light of the USDA-Land Grant Colleges program to stimulate larger uses of fertilizers to increase plant yields and raise the productive capacity of limited acres. To get more fertilizer, farmers often need ready cash, so bankers in all parts of the country play an important part in aiding the program with loans.

Another important relationship, that between the state experiment stations and the fertilizer industry, will come in for consideration by an experiment station director, W. M. Fifield, director of the station at Gainesville, Fla.

The final talk on the program will be made by W. R. Allstetter, recently named vice president of the association. Alstetter is scheduled to make observations on recent developments in the industry and the outlook for the future.

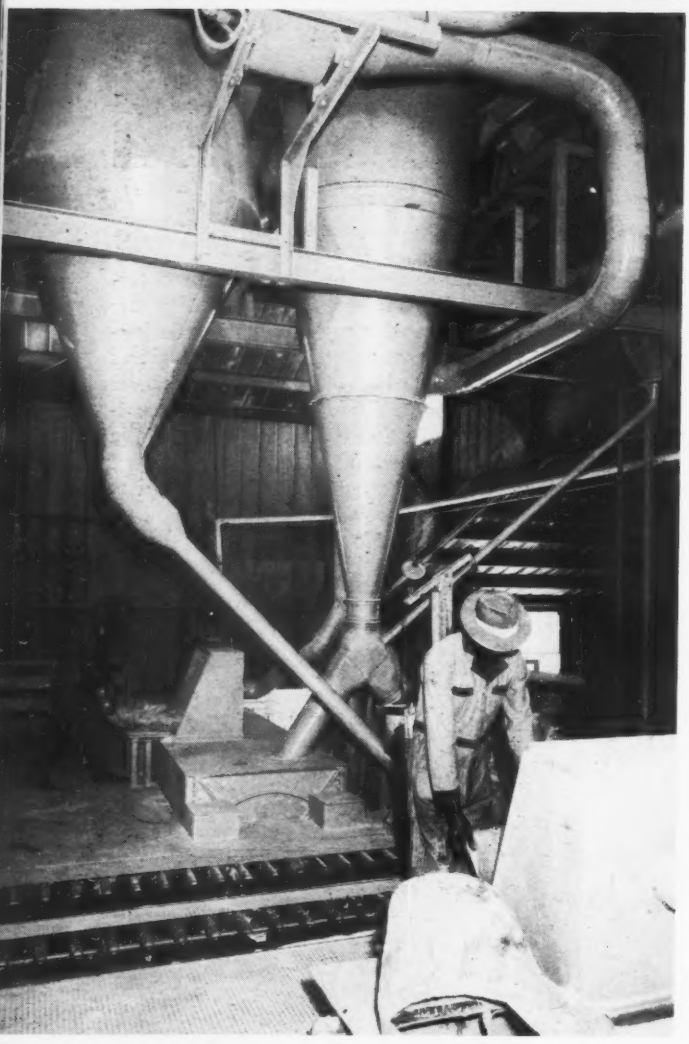
Annual NFA Banquet

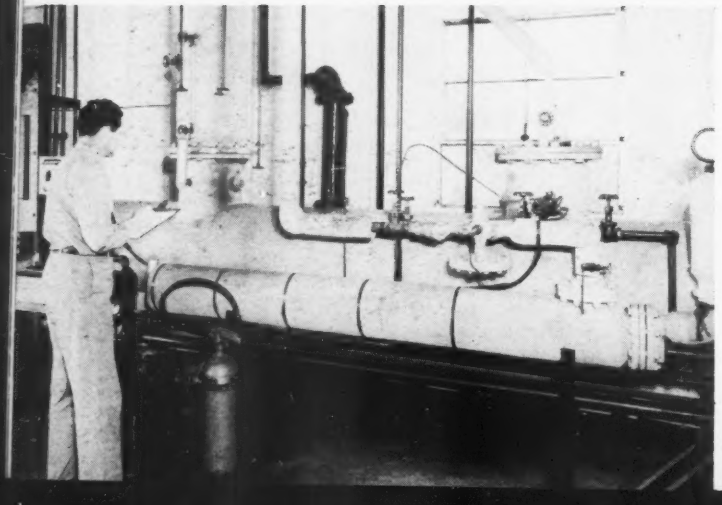
Highlight of the three-day convention will be the annual fall dinner, set for Thursday evening, Nov. 20. A social hour, given by the H. J. Baker & Bro. Co. of New York City, will precede the dinner.

A boat ride, bus tour and fashion show are scheduled for the entertainment of women attending the convention. And for conventioneers who want to combine business with pleasure, a private travel agency is offering special post-convention tours to Havana, Cuba and Nassau.

A meeting of the NFA board of directors will be held at 2 p.m. on Friday, Nov. 21. ◆

Dramatic view of the Roney Plaza Hotel, Miami Beach, with floodlights lighting palms and center tower. NFA meets there Nov. 19.





Six years ago Chapman Chemical entered farm chemicals field after

Cashing In

RESEARCH often has been termed the life blood of industrial progress. Without it there could be no new products. There would be no improvement in old ones.

That's why companies in the farm chemicals industry—and every other industry, for that matter—annually spend thousands of dollars for research.

Many companies owe their success and prosperity directly to research—and that's the case with the Chapman Chemical Company, of Memphis, Tenn., according to J. W. George, manager of merchandising and sales promotion for the organization.

From Many Angles

There are several ways the Chapman story could be told: As a sound chemical development in the South or as the achievement of a foresighted man who foresaw the possibility of chemical treatment of wood to protect it against the ravages of fungi and insects. But primarily, the development of Chapman Chemical is linked to research and technological development in the field of protectants for wood and forest products—and much of that research must be credited to Chapman Chemical, for fundamental development initiated in its modern laboratory facilities in Memphis and in the field.

"Success of the company has resulted from Chapman's ability to cash in on the development work and research which has been carried on in the field," George declares.

Today the company enjoys a worldwide reputation as manufacturers and consultants in the field of wood preservation. The company also is a leader in the field of farm chemicals in the Mid-South.

Success didn't come over night.

Aerial view of Chapman Chemical Co., Memphis, Tenn., is shown in top photo. Center: Charging area for farm chemicals. Lower: Full-scale pilot plant built to commercial pressure treating standards, part of intensive research program.

Second article in FARM CHEMICALS *new series on fertilizer and pesticide manufacturers.*

on Research

The company started from scratch 20 years ago by A. Dale Chapman to serve the sawmill industry with newly developed chlorinated phenol chemicals to control sapstain and mold in freshly cut lumber.

The expansion into the allied field of chemicals for agriculture was made just six years ago, during the initial stages of the pesticide industry's big boom following World War II.

A complete line of insecticides and herbicides now is produced in the Memphis plant. Organic chemicals have been developed for control of insects on cotton, soybeans and tobacco. Dust and emulsifiable concentrates are featured, along with herbicides for farm and industrial application.

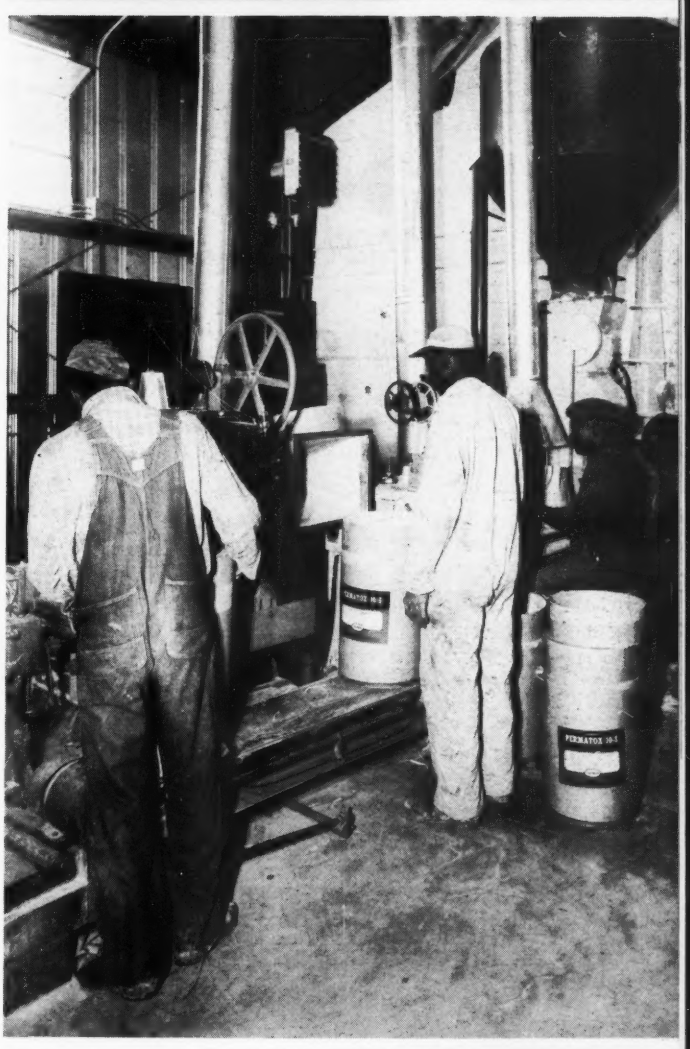
Foresaw Big Development

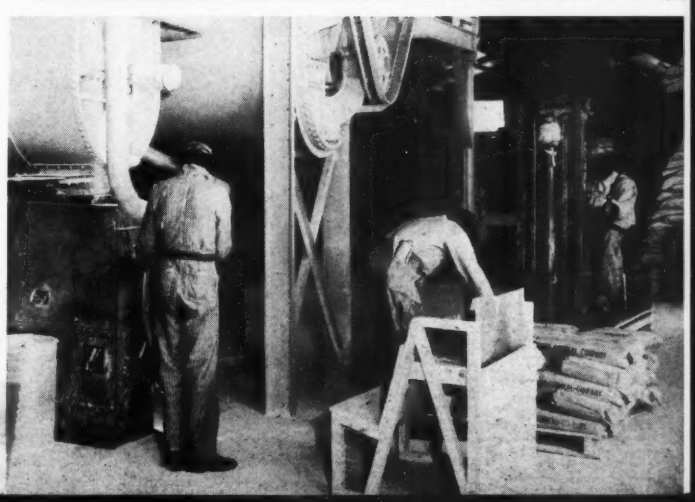
Chapman, who had served with the Forests Products Laboratory, foresaw a big future development in the field of chemical treatment of wood to protect it from disease and insects.

So convinced was he of the opportunities in the field, he left the Service in 1913 and set up the company's first office in New Orleans to serve as distributor of wood preservative chemicals for Dow Chemical Company.

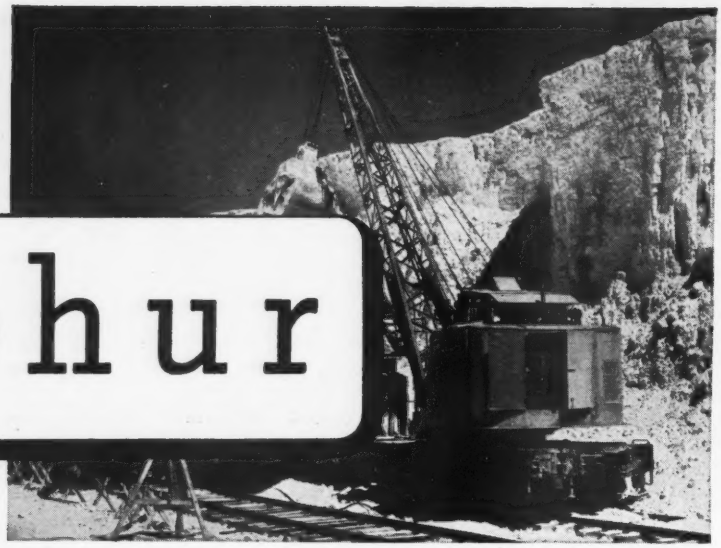
A branch office was opened in Chicago a few years later and another was added at Portland, Ore., shortly thereafter. The Memphis plant was constructed in 1941, starting with one building and expanding to what the company considers one of the finest plants in the country.

Nine buildings now are included in the organization, with more than 30,000 feet of floor space. Large liquid storage tanks are located along an 11-car railroad siding. W. F. Johnson, vice president of Chap-





Top: Plant control lab facilities. Control analyses are run on all products as they progress. Center: Semi-automatic bagging machines. Lower: Pesticides are mixed and bagged. Ribbon blenders assure uniform mixing of the product.



Sulphur

Thousands of tons mined daily, but where does it all go?

Did you ever have the misfortune on a steaming, sticky, sultry day to sit it out on a crowded parkway, bumper to bumper, waiting for traffic to clear? No doubt your thoughts were plenty sulphurous but probably not along the lines we have in mind.

We're thinking of the mineral Sulphur and its link with the automobile. Each car accounts for a substantial poundage of Sulphur, some estimates put it at around 25 pounds for the average car. Give or take 5 pounds, it shows that a tremendous tonnage of Sulphur is needed each year to put cars, buses and trucks on the road ready to operate. And don't forget the tire and battery replacements going on every day.

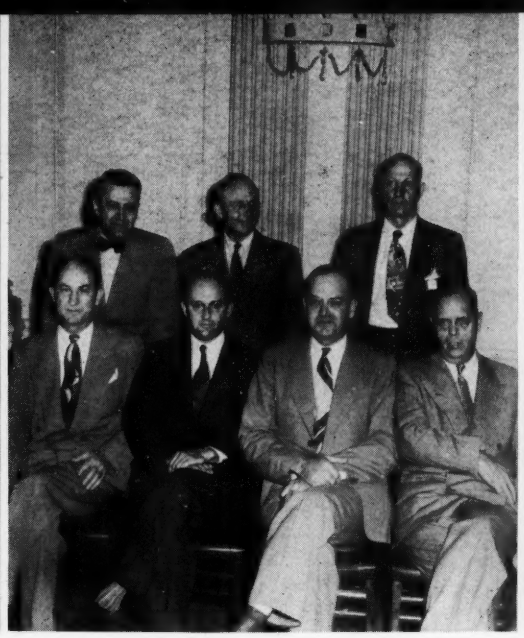
Sulphur enters the automobile picture through the tires, steel sheets, plated and plastic fittings, glass, battery acid and parts, copper tubing and wiring . . . all of which call for the use of Sulphur or its compounds in connection with their manufacture.

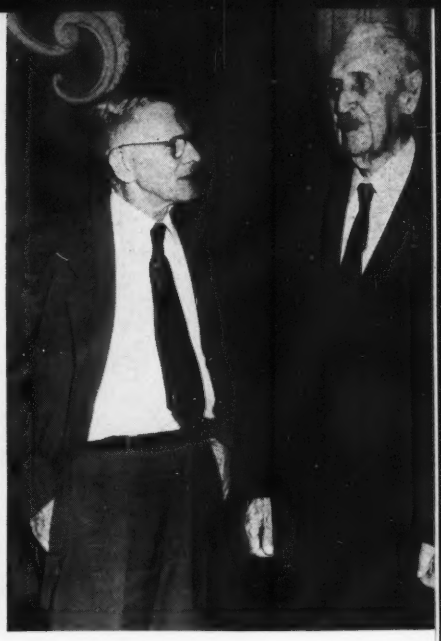
Can you wonder that Sulphur goes into industry just about as fast as the sulphur producers of the Gulf Coast Region can get it above ground and cooled preparatory to shipment?

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas
Spindletop, Texas • Worland, Wyoming





Left: NFA meets APFC at meeting of Association of American Fertilizer Control Officials in Washington. Fred Lodge, left, NFA adviser, chats with John R. Taylor, Plant Food Council agronomist. Center: Officers and directors sit for group photo after close of meeting. Front, from left, Parks A. Yeats, Okla., new president; Henry A. Davis, N. H., vice president; Bruce D. Cloaninger, S. C., secretary-treasurer and J. F. Fudge, Tex., retiring president. Rear, M. P. Etheredge, Miss., R. W. Ludwick, N. M., and G. W. Michael, Ottawa, members of board of directors. Right, W. R. Austin, Armour Fertilizer, talks about the old days in the industry with Henry A. Huston, 94, of New York, only living charter member of A.O.A.C.

Soil conditioner problem, pesticides in fertilizers, custom mixes discussed by

Fertilizer Control Officials

By Hamilton C. Carson
Managing Editor

MEMBERS of the farm chemicals industry could have obtained a lot of valuable information and listened to some important discussions about leading agricultural problems at the sixth annual convention of the Association of American Fertilizer Control Officials at the Shoreham Hotel in Washington, D. C.

Many industry leaders did just that. For in addition to the official attendance, 135 members, representing 38 states and the U.S. D.A., many top officials from fertilizer and pesticide companies were present at the session October 3 and participated in the discussions.

Leading Questions

Some of the leading questions considered by the officials and their industry guests included the following:

1. **Soil conditioners.** J. F. Fudge, retiring president of the control officials, declared that the conditioners undoubtedly have beneficial results when properly used but decried "false and misleading statements." In a talk on the new polyelectrolyte soil amendments, Allen B. Lemmon, Chief of the Bureau of Chemistry, Sacramento, Calif., said there has not yet been developed an adequate test to determine the effectiveness of conditioners. "There probably will be some disappointment in the first year of the conditioners," he predicted, but said the new materials "have a useful place in the agricultural economy."

2. **Pesticides in Fertilizers.** Lemmon also discussed this situation at length in a report. He summarized replies to a questionnaire sent to state officials and stressed the importance of labeling such mixtures so that the consumer realizes the nature of the economic poison contained therein. Many suggestions were made from the floor in regard to the contents of labels for fertilizer-pesticide mixtures but no final action was taken on the matter.

Custom Blends

3. **Custom Fertilizers.** The increasing trend of some companies to provide a "prescription" fertilizer to meet the exact needs of crops and soils based on field tests was aired by the organization. Primary problem to the control officials is whether all the various fertilizer proportions recommended for various soils and in many cases differing only very slightly from other ratios should be listed separately by the officials for purposes of control.

M. B. Rowe, who discussed bulk fertilizer distribution, which includes the custom-mix field, cited

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

The word on a Multiwall buyer's tongue just after he's said, "Well, as long as we order by specification, I guess one brand's as good as another . . ."

Executives who purchase more than 85 per cent of all Multiwalls have a big BUT there.

They testify* that there are many other considerations. Among the most important, the reputation of the manufacturer. They judge him by his record of reliability, his effort to meet delivery dates, his willingness to give a full measure of service.

We welcome the challenge of the toughest three-letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

**August, 1951 research study.*

UNION BAG & PAPER CORPORATION • NEW YORK: WOOLWORTH BUILDING • CHICAGO: DAILY NEWS BUILDING

advantages of the method in saving time and labor. A lively discussion followed with most members in agreement that bulk shipments should in all cases be accompanied by a tag certifying contents.

Bruce D. Cloaninger, secretary-treasurer of the group, said he thought the standard ratios of N, P and K were sufficient and cautioned the industry "not to get into the prescription fertilizer business."

Other highlights of the meeting were addresses by Russell Coleman, president of the National Fertilizer Association, and Paul T. Truitt, president of the American Plant Food Council.

Both organizations were hosts at banquets honoring the control officials: NFA on October 3 and the Plant Food Council the following evening.

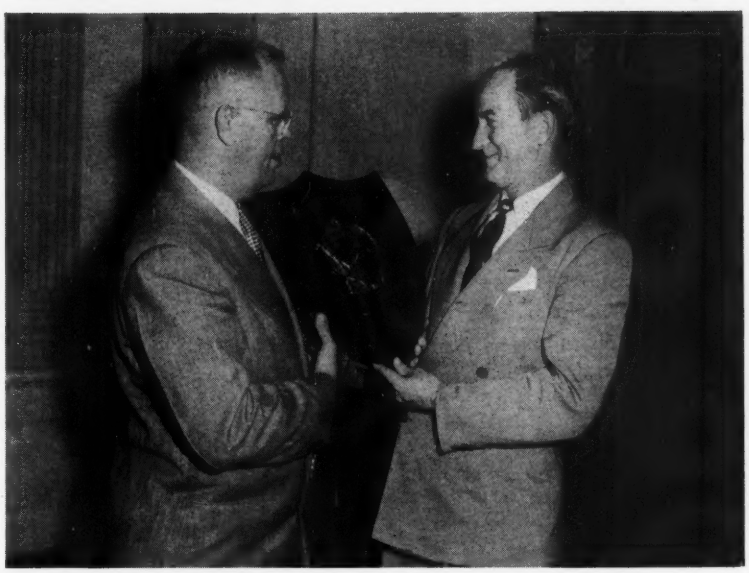
Broader Program

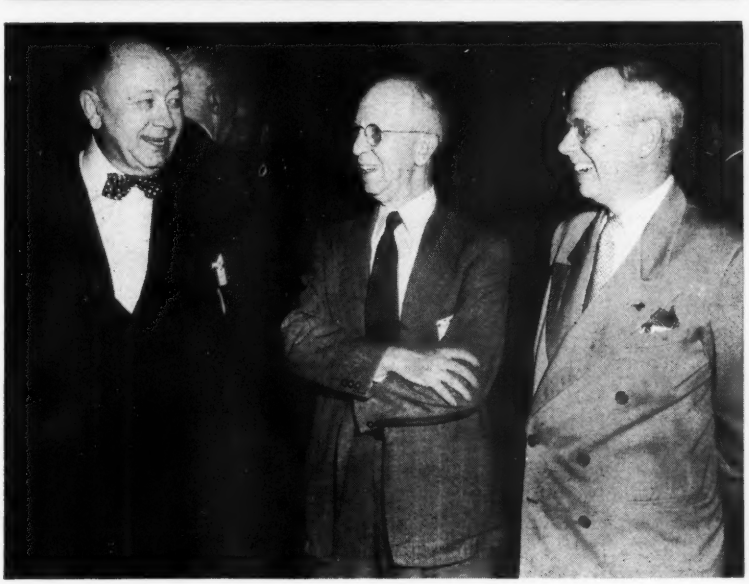
"A broader fertilizer utilization program is needed," Coleman said, "to assure better farming, a higher standard of living and an improved national economy."

He summarized fertilizer consumption in various sections of the country, stressing the early leadership of the south and the rise of the corn belt to a present position of equal importance. Coleman said fertilizer use continues to increase but that consumption still "is far below state recommendations."

Truitt centered his talk around two major points: the nation-wide fertilizer expansion sought by the U.S.D.A. and the U.S.D.A.-Land Grant College program for more and better use of fertilizer and lime.

He said expansion in the industry was progressing nicely. In regard to the second program, Truitt asserted it offered an opportunity "for every segment of the nation to receive benefits." He urged compilation of figures on fertilizer use and effectiveness from all the states (a request reiterated by





Top: Byron T. Shaw and R. Q. Parks, from left, U.S.D.A., talk with A. H. Moseman, chief of Bureau of Plant Industry. Center: J. F. Fudge, retiring president, left, and Parks A. Yeats, new president, look at one of plaq es presented to presidents of organization. Bottom: Dr. Arthur M. Smith, Mathieson Chem.; John B. Smith and G. D. Romaine, American Potash Institute, from left.

Fudge in his address) to show the value of increased fertilizer usage.

Job of the fertilizer industry, according to the speaker, is to produce more fertilizer, improve the quality and cooperate with the sponsoring agencies.

Dr. Frank W. Parker, of the U.S.D.A., urged higher concentrations of plant foods in another talk before the organization. "By raising concentrations," Parker said, "farmers could be saved 213 million dollars a year." He added that farmers, the fertilizer industry and the general public stand to benefit from such a program.

Manufacturing Problems

Edwin C. Kapusta, chemical engineer for NFA, outlined some manufacturing problems and new developments in fertilizer technology mentioning the following areas which he said need further research: acidulation of rock phosphate; production of mixed fertilizers and physical conditions of fertilizer mixtures. Use of nitric acid and other acid mixtures in acidulation were considered by Kapusta, who also described briefly the TVA and European developments in the superphosphate field.

After hearing reports from state investigators, the association named Parks A. Yeats, of Oklahoma, to move up from vice president to the presidency. Henry A. Davis, of New Hampshire, was elected vice president. Cloaninger continues as secretary-treasurer. G. W. Michael, of Ottawa, Canada, was re-elected to the executive committee and Harry R. Allen, of Kentucky, and M. P. Etheredge, of Mississippi, were elected to the committee.

Dr. K. D. Jacob, of the U.S. D.A., Beltsville Station, presented plaques to ex-presidents of the organization, including D. S. Coltrane, Lemmon, Cloaninger, John B. Smith, Rodney C. Berry, and Fudge. Coltrane was absent. ◆

Top: G. W. Michael, left, and C. V. Marshall, right, Ottawa, talk with J. D. Romaine, American Potash Institute. Center: Bruce D. Cloaninger, left, secretary treasurer, chats with Dr. Vincent Sauchelli, Davison. Bottom: H. A. Lepper, center, Food & Drug Administration, confers with J. J. Taylor, left, and W. C. Geagley, before dinner.

New processes are featured in second group of abstracts from

Pesticide, Fertilizer Papers at ACS Meeting

Following are some more abstracts of papers presented at 122nd national meeting of American Chemical Society in Atlantic City, N. J., Sept. 14–19, of interest to farm chemicals industry. Others were printed in October FARM CHEMICALS.

Pesticide Abstracts

"Absorption and Translocation of Herbicides." A. S. Crafts, Division of Botany, University of California, Davis, Calif.

—

To kill perennial plants a herbicide must penetrate the cuticle. This layer is oil-like and bears a negative electrostatic charge. Totaling an appreciable mass, it acts not only as a barrier to penetration but as a solution medium for fat-soluble forms of herbicides.

Following penetration the herbicide molecule must part to the aqueous medium of the mesophyll cells and migrate to the phloem, where it is carried with food materials to the growing points and roots. Translocation through the phloem hinges upon the fact that this tissue may act as an elongated, ramifying osmotic system in which flow of solution is conditioned by synthesis in leaves and utilization in stems, root, and meristems.

Cytoplasm in the phloem is highly specialized, being in a low state of activity and highly permeable. Flow of the assimilate stream through this system may attain linear rates as high as 100 cm. per hour or more. 2,4-D is carried with foods through this system.

To utilize this mechanism the formulation should enhance penetration, the herbicide molecules should be as nearly neutral as possible, they should have a balanced solubility favoring partition to the aqueous phloem, and application should be spotwise to growing synthesizing plants.

"Chemical Methods of Brush Control." R. H. Beatty, Agricultural Chemicals Division, American Chemical Paint Co., Ambler, Pa.

—

The control of woody plants in this country by chemical methods has progressed rapidly since the introduction of 2,4-dichlorophenoxyacetic acid in 1945.

2,4-D, 2,4,5-T and ammonium sulfamate are being sprayed on millions of acres to control woody plants on utility right-of-ways, to eliminate undesirable woody plants from forests and to control certain woody species in pastures.

These chemicals are being formulated to be applied in oil, oil-water mixture and water and are being applied by airplane and ground equipment. The growth regulator compounds are being used as low volatile ester such as butoxyethanol and proplene glycol butyl ether. These materials are less volatile than the older types such as ethyl, butyl and isopropyl and seem to be equal to or more effective in killing the woody plants.

Airplane applications of 2,4-D or 2,4,5-T or mixture are applied in oil, at rates ranging from 0.75 to 3 pounds total acid per acre. Repeat application at low rates seem to be more effective than single applications at higher rates.

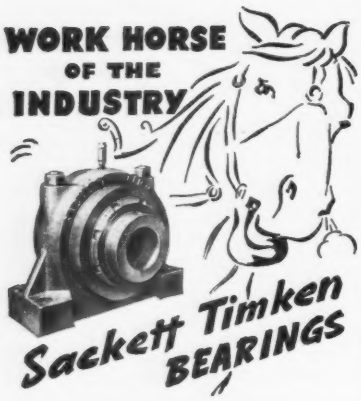
Ground equipment including power sprayers and knapsack sprayers are used for applying the growth regulators and ammonium sulfamate. These materials are used as foliage spray basal spray, stump spray, and the Frill method. The method and chemical formulation must be selected for the particular end use.

The unsolved problem before the research chemist and biologist in the chemical control of woody plants is to find a compound which will translocate or its breakdown products translocate further into the root system of many of our woody plants. These present materials do not translocate in a horizontal direction as well as we would like.

"Pre-Emergence Methods of Weed Control." D. E. Wolf, Grasselli Chemicals Dept., E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

—

Pre-emergence weed control refers to the application of the chemical to the soil after the crop has been planted but before it emerges. This weed control practice still is in an early stage of development and several chemicals have given outstanding results. The chemicals with which the most favorable results have been obtained in this type of treatment



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are 2,4-dichlorophenoxyacetic acid (2,4-D), calcium cyanamide, 3-(*p*-chlorophenyl)-1, 1-dimethylurea (CMU), 2-sec-butyl-4,6-dinitrophenol (DNOSBP), sodium 2,4-dichlorophenoxyethyl sulfate, sodium trichloroacetic acid (90 per cent TCA) and *m*-chloro isopropyl phenylcarbamate (chloro IPC). The factors affecting the results of pre-emergence treatments are: (1)—type of weeds present; (2)—moisture content of the soil; (3)—rainfall; (4)—soil *p*H; (5)—soil type; (6)—organic matter content; (7)—soil temperature; and (8)—type of crop.

"Contact Herbicides as Preharvest Crop Defoliants and Desiccants." L. M. Stahler, U. S. D. A., Bureau of Plant Industry, Beltsville, Md.

—

Contact type, chemical herbicides were first used to defoliate cotton and potatoes as an aid in harvesting of these crops as early as 1940. Only in the past several years has this new use of herbicides developed wide popular acceptance and been extended to other crops and practices.

Contact, preharvest herbicidal chemicals serve to hasten drying and maturation of seed, tubers and fibers of treated crops and eliminate succulent weeds growing with the crop; facilitating mechanical harvesting and safe storage of the seed and tuber crops and picking and ginning of cotton.

Most extensive use of defoliant herbicides is now employed in cotton production where the elimination of green leaves, squares and succulent weed growth is almost essential to efficient operation of mechanical pickers or strippers. Salts of cyanamide or cyanate applied as dust in regions of high humidity or morning dew; water spray solutions of soluble cyanamides, ammonium thiocyanate, sodium monochloroacetate, sodium chlorate-borax formulations and endothal, in the western areas of low relative humidity are most popular herbicidal materials. Airplane application is almost universal.

Experimental use of endothal, sodium monochloroacetate and chlorate-borax formulations as desiccants on field standing rice has resulted in sufficient reduction in moisture content of harvested grain to permit elimination of mill drying and greatly facilitates straight combining of weedy or lodged crops.

Use of contact herbicides as foliage desiccants to secure maximum seed maturity and harvest of indeterminate fruiting legumes is rapidly gaining in research interest and field practice. Use of materials, such as endothal, to defoliate certain ornamentals for storage and shipping is replacing hand picking or cold weather abscission in the floral trade.

"Formulation of Herbicides." J. A. Kelly, The Dow Chemical Co., Midland, Mich.

—

The formulation of herbicides probably is best illustrated by discussing in some detail current best practices in the field.

I. Herbicides of the plant growth regulator type.

(1) Water-soluble form of 2,4-dichlorophenoxyacetic acid (2,4-D). (a) Sodium salt. (b) Amine salt. In this category will be found one of the more important formulation types and the various amine salts are discussed in some detail. Attention is paid to sequestering agents, solubilities and general properties of these salts.

(2) Water-emulsifiable forms of 2,4-D and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). (a) A brief resume of the physical properties of some of the available esters is included. (b) Solubilities of certain of the esters of 2,4-D in various commercially available solvents are discussed. (c) Choosing an emulsifier for 2,4-D formulations. (d) Laboratory evaluation of emulsions. (e) Physical stability of 2,4-D ester formulations. (f) Other considerations.

(3) Herbicides of the 4-chloro-2-methylphenoxyacetic acid type (MCP). This includes a brief discussion on currently used formulations.

II. Herbicides for total kill of vegetation and/or for selective kill of vegetation.

(1) Water-soluble form of 4,6-dinitro-2-secondary-butyl phenol (DNOSBP). (a) Selective type herbicides.

(2) Water-emulsifiable form of

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DNOSBP. (a) Solvents useful in this regard. (b) Characteristics of a good DN formulation. (c) Container problems.

(3) Water-emulsifiable form of pentachlorophenol. (a) Useful solvents.

III. Residual pre-emergence herbicide.

(1) Water-soluble form of 4,6-dinitro-2-sec-butyl phenol. (a) General formulation problems are discussed. (b) How these formulations differ from other DN formulations is discussed.

"Critical Aspects of Herbicide Residues in Soil." R. J. Aldrich, U. S. D. A., Division of Weed Investigations, New Jersey Agricultural Experiment Station, New Brunswick, N. J.

—

Herbicide residues in soil are extremely important through their immediate effect on the growth of subsequent crops and through their possible long-term influence on soil properties.

The effect of continuous repeated applications of herbicides on soil properties has not been adequately studied. Herbicides may influence soil properties indirectly through their effect on soil microorganisms and directly through the addition of appreciable quantities of chemicals which will alter the chemical composition of the soil.

Herbicides, or the effect of herbicides, are removed from the soil by leaching, fixation by the soil colloids, decomposition and volatilization. Conditions which affect these means of removal determine the persistence of a herbicide in the soil. The effects of rainfall and soil texture on leaching of a herbicide are obvious.

Among the physical properties of a herbicidal spray which may affect leaching of the herbicide are the solubility of the compound in water and the carrier in which the herbicide is applied. The fixation of a herbicide in the soil is dependent on the soil colloid content and physical properties of the herbicide molecule. Decomposition of a herbicide, resulting from chemical reactions in the soil but largely through the action of microorganisms, is influenced by soil temperature, soil moisture, soil organic matter content and other soil factors.

"Analysis of Human Fat for DDT and Related Substances." A. M. Mattson, Janet T. Spillane, Curtis Baker, and G. W. Pearce, Communicable Disease Center, Public Health Service, Federal Security Agency, Savannah, Ga.

—

In the course of examining human fat samples for the presence of stored DDT it was found necessary to study the Davidow column for removing interfering fat and the Schecter-Haller method for analyzing the isolated material. By employing these techniques in conjunction with a Model B Beckman spectrophotometer and using a 1-cm. absorption cuvette, 5 micrograms of DDT can generally be estimated with an accuracy of + 10 per cent.

Below 5 micrograms the optical density readings become so small that variations in blank values become increasingly important and the errors mount rapidly. One microgram can be detected, but the results obtained are only roughly quantitive and may be in error by 100 per cent.

Mixtures of *p,p'*-DDE and *p,p'*-DDT can be resolved with this same degree of accuracy in amounts of 10 micrograms of total material containing from 20 to 100 per cent DDE by using the method of calculation of Knudson et al.

While analyzing human fat samples by a modified Schecter-Haller method it was found that red or purplish-red colors typical of degradation products of DDT were obtained in practically all cases. That these red colors were not due to the methods of isolation and analysis was demonstrated by tests on known amounts of pure materials.

Absorption spectra studies showed the presence of materials having spectra very similar to that given by *p,p'*-DDE in the presence of *p,p'*-DDT. Other possible degradation products of DDT are DDA [*p,p'*-bis (*p*-chlorophenyl) acetic acid] and DBP (4,4'-dichlorobenzopheone). The latter materials have been found to be retained by the Davidow column. Therefore, it is suggested that the degradation product being analyzed for by these techniques is DDE.

Calculations of the relative amounts of DDT and DDE as well as their total amounts in parts per million have been made on approximately 80 fat samples. Only five samples showed no detectable amounts of DDT or DDE. The remainder gave evidence of containing mixtures of DDT and DDE varying from 33 to 90 per cent DDE. The large majority of samples were found to contain DDE in amounts approximately equal to or larger than the DDT content.

The total amount of DDE plus DDT has been found to vary from a few to 200 p.p.m., the higher values being observed in cases of known high exposure. In general, values of two to 20 p.p.m. are found most frequently.

In the case of experimentally exposed animals DDT appears to be stored largely as such in the fat. The study reported here indicates that a substantial proportion of DDE is present in human fat in addition to DDT. Presumably the Schecter-Haller positive materials arise from DDT contamination of many common foodstuffs. Whether the DDE found was ingested or arose from degradation after ingestion is not known. It would seem, however, that the possible hazards involved in the widespread use of DDT need to be reconsidered and further investigated.

"Microdetermination of *N*-1 Naphthylphthalamic Acid Residues." Allen E. Smith, Naugatuck Chemicals Div., United States Rubber Co., Naugatuck, Conn.

—

N-1 naphthylphthalamic acid and several of its functional derivatives have been found to be selective pre-emergence herbicides. Since these materials are being widely tested for use with a variety of crops, an accurate method for the microdetermination of residues in crops and soil has been required. The method developed involves hydrolysis of the herbicides to give 1-naphthylamine which is coupled with the diazonium salt of sulfanilic acid, giving a red azo dye; this is determined colorimetrically.

The sample may be treated with either acid or base to hydrolyze the herbicide. In either case, the naphthylamine is then steam distilled from basic solution. By proper selection of hydrolytic procedure a variety of samples including soil, vine crops, beans and cottonseed oil have been analyzed. With typical samples, less than 5 micrograms of N-1-naphthylphthalamic acid results in a visible pink color in the final solution. In the 5 microgram range recoveries of 80 to 100 per cent have been attained.

No residues have been found thus far in crops grown on treated land. Soil residues are being determined to measure the persistence of the herbicide in soil under various conditions.

"Synthesis, Structural Properties, and Method of Preparation of a New Organic Arsenical Insecticide, Arsenomethane As-1,2-Disulfide." Roland M. Kary, Central Research Laboratory, American Smelting & Refining Co., Barber, N. J.

—

While organic arsenicals did not pass the stage of preliminary testing, promising if not superior insecticidal properties in comparison with inorganic arsenical insecticides are indicated. Attempts to sythesize aliphatic arsenomethane polymers led to discovery of a new compound, the arsenomethane As-1,2-disulfide. Structure, chemical and physical properties, and a new type of reaction to synthesize the compound are described.

Reference is made to recently reported data on toxicological properties, according to which the new compound exhibits considerable toxicity to test insects locally available. Phytotoxicity data are, also, limited by the locality of testing; further testing is said to be warranted on insects infesting crops reasonably tolerant to arsenicals.

Preliminary research on other organic arsenosulfides suggests possibilities of synthesizing a new type of arsenical insecticide by combination of the central and, presumably, toxic arsenosulfide structure with organic radicals of experienced toxicity. Thus, contact poison effects of organics could be added to the known stomach poison effects of inorganic arsenic.

Fertilizer Abstracts

"Potentials of Fertilizer Use for More Efficient Crop Production as Applied to the Western States." John P. Conrad, California Agricultural Experiment Station, Davis, California.

—

Historically growers of tree and vegetable crops with their higher-per-acre returns have applied adequate to even overly generous amounts of fertilizers if reasonable responses were to be secured, or even only anticipated. As a result, the use of nitrogen has become rather widespread, while experimentation has demonstrated many local areas, each where one or more of the following elements give responses: phosphorus, potassium, sulfur, iron, manganese, copper and zinc.

Growers of field crops depended largely on the original fertility of the soil. As dry-farmed grain yields progressively declined, intervening pasture and/or fallow for one or more years was used. The nitrogen supply was helped where planted or volunteering forage legumes were grown. The cost of nitrogen fertilization was considered prohibitive unless responses were large.

Under irrigation, alfalfa and other legumes in the rotation were depended on to maintain the nitrogen supply, application of phosphorus, potassium, sulfur, boron and/or other nutrients for the legumes being made locally as deemed necessary.

The bringing of more land under irrigation and the great economic changes attending World War II with the marked increase in the price of agricultural commodities in contrast to the relatively smaller increases in the cost of fertilizers have led to a much greater use of these materials.

If future changes in economic conditions are not too great, we may look forward to a small but gradually increasing use of added plant nutrients on horticultural crops as the acreage is increased and as virgin fertility declines. Much more is known of the deficiencies of our soils for the growth of these crops.

"Chemical and Physical Properties of Ammoniated Superphosphate." F. L. Turbett and J. G. MacArthur, Spencer Chemical Co., Pittsburg, Kan.

—

The effect of ammoniating solutions on the condition of mixed fertilizers has long been a subject of conjecture, and little systemized study has been reported. In this paper, attempts have been made definitely to assign responsibilities for certain physical characteristics of the mixed goods.

A method for evaluating caking tendencies is outlined and laboratory and field work are correlated, showing possible steps which may be taken to improve condition of mixed goods through the use of ammoniating solutions.

"Prevention of Reversion of P_2O_5 in Calcium Phosphate and Its Application to the Manufacture of Fertilizers in an Alkaline Medium." Louis E. Andres, Potasse & Engrais Chimiques, Paris, France.

—

When increasing amounts of ammonia are added to the product obtained by the action of nitric acid on rock phosphate, water-insoluble calcium phosphates are precipitated. The first fractions precipitated are soluble in ammonium citrate and they correspond to bicalcium phosphate. Additional amounts of ammonia render the P_2O_5 insoluble in ammonium citrate. Under industrial conditions, the addition of ammonia has to be stopped before *p*H 3.4 is reached, and the slurry is acid.

It is possible to keep the calcium phosphate entirely soluble in ammonium citrate until *p*H 9.5 is reached in the slurry, if small amounts of a magnesium salt are added to the nitric acid attacking the phosphate rock. Aluminum, manganese and nickel salts have the same effect. It thus is possible to ammoniate superphosphate up to *p*H 9.5 without reversion of P_2O_5.

In this process it is possible by introducing carbon dioxide to eliminate the calcium nitrate formed by the action of nitric acid on

(Continued on page 70)

ANOTHER THANKSGIVING IS HERE

That big strutting turkey gobbler means only one thing at this time of year—another Thanksgiving is on its way. The leaves have turned, the frosts are beginning, the fodder is in the shock, and the turkey will soon be on a plate, stuffed with dressing and surrounded by cranberry sauce.

• • •

(1) valve, sewn sack; (2) valve, pasted sack; (3) open mouth, pasted sack; (4) open mouth, sewn sack

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11-3 Hardinge Mills

A revolutionary principle of control which automatically regulates the feed rate of the mill to keep it operating at maximum efficiency is one of the main features of the Hardinge Co. line of mills. Compensation is made for changes in grindability caused by variation in hardness, size of particles, etc., the company claims. Conical, batch, rod, cylindrical and other types of mills are included in the company's line. **Code Number 11-3.**

11-4 Pneumatic Controller

A new catalog from Fischer & Porter Co. describes a completely new P-4 Pneumatrol Pneumatic Controller for rate of flow, differential pressure, liquid level, viscosity, pressure and temperature applications. The company says the controller is applicable for either single or dual instrument case mounting and for point-of-measurement installation as well. Action and components of the controller are described in the booklet. **Code Number 11-4.**

11-5 Bin-Dicators

The complete line of Bin-Dicator products is described in a new booklet recently printed by the company. Level of granular and pulverized material processed by fertilizer manufacturers can be indicated accurately by using a Bin-Dicator instrument, the company states. The instruments actuate signals if required, and can be used to start and stop loading and filling machinery, as required by the level of content in the storage unit. The booklet is illustrated. **Code Number 11-5.**

11-6 Naylor Fittings

A practical way to save time and money, according to Naylor Pipe Co., is to use their line of fabricated pipe fittings. An illustrated pamphlet from the company shows how the fittings eliminate numerous flanged joints in plants or combine many fittings into one

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

11-1	Lowerator-Conveyor
11-2	Com-Bin Feeder
11-3	Hardinge Mills
11-4	Pneumatic Controller
11-5	Bin-Dicators
11-6	Naylor Fittings
11-7	Bag Guide
11-8	Surface Active Agents
11-9	Phillips Nitrogen
11-10	Chemico Facilities
11-11	Sackett Equipment
11-12	Monsanto Plants
11-13	Chemical Storage
11-14	Stedman Equipment
11-15	U.S.S. Ammonium Sulfate

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integral unit. The company says all types of fabrications of standard weight pipe can be provided. **Code Number 11-6.**

11-7 Bag Guide

All the information needed to specify the proper multiwall bag for any product is covered in an excellent new guide booklet put out by Bagpak Division of International Paper Co. Illustrations of the five basic types of multiwalls . . . sewn open mouth, sewn valve, pasted open mouth, pasted valve and automatic or self-opening sack . . . are provided along with statistics on strength and application. Other subjects discussed are bag kraft paper, bag printing, pelletizing and bundling. **Code Number 11-7.**

11-8 Surface-Active Agents

Insecticide manufacturers will be interested in a pamphlet describing the "widening uses" for surface-active agents, recently prepared by Glyco Products Co. It describes wide range of properties of the agents and outlines application of the polyhydric alcohol fatty acid esters in the chemical industry. Chemical structure and physical properties of the products are discussed. **Code Number 11-8.**

11-9 Phillips Nitrogen

No corrosion . . . more Nitrogen per dollar. That's the claim Phillips Chemical Co. makes for its products. Literature from the company describes three Phillips 66 nitrogen solutions suitable for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. Solutions are shipped to mixers and formulators in aluminum tank cars to prevent corrosion. **Code Number 11-9.**

11-10 Chemico Facilities

Enriched and triple superphosphate fertilizers can be produced on a commercial basis in conventional single superphosphate dens, Chemical Construction Corp. states. The organization can add facilities to your plant to substitute phosphoric acid for sulfuric in the manufacturing process. Literature from the company shows diagrams which prove their statements. Chemico methods can be adapted to suit the needs of any manufacturing plant. **Code Number 11-10.**

11-11 Sackett Equipment

When it comes to equipment, A. J. Sackett & Sons think they have something extra to offer fertilizer manufacturers. Their line, described in company literature, includes custom-engineered equipment for receiving, mixed goods manufacturing, superphosphate milling, screening and bulk shipping operations. Equipment is designed to meet the particular needs of various plants. **Code Number 11-11.**

11-12 Monsanto Plants

If you are considering construction of a sulfuric acid plant you will be wise to get the advice of Monsanto company engineers. According to the company, approximately 40 per cent of the free world's contact sulfuric acid is produced with Monsanto Vanadium Catalyst in company designed plants. Plants operate with all known raw materials, according to company literature, and do not depend on elemental sulfur alone. **Code Number 11-12.**

11-13 Chemical Storage

Farm chemicals will be protected against fire, acid, moisture and the elements if Marietta concrete silos are used for their storage, the company declares. In addition, insurance rates can be reduced. The silos can be erected in any arrangement . . . line, cluster or combined with existing units for added storage, according to information from the company. **Code Number 11-13.**

11-14 Stedman Equipment

All types of fertilizer plant equipment . . . from mixing and bagging units to vibrating screens and acid weigh scales . . . are included in the Stedman company line, according to literature from the company. The company, in its 50th year, also offers batch mixers, pan mixers, pulverizers and dust weigh hoppers for the industry. **Code Number 11-14.**

11-15 U.S.S. Ammonium Sulfate

You have an extra selling point when you use U.S.S. ammonium sulfate to supply the nitrogen in your fertilizers, the company declares. The dry, free-running nitrogen material mixes easily, stands up in storage and handles well in drills or other distributing equipment, according to literature from United States Steel Corp. **Code Number 11-15**

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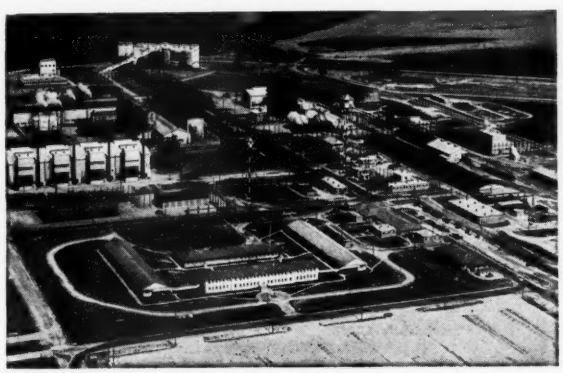

For well-conditioned fertilizer at low cost, many mixers prefer Spensol (Spencer Nitrogen Solutions). Plants like this are strategically located to assure mixers fast, dependable Spencer service.

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● Joseph T. and Benjamin L. Seem, operating the Seem Seed Co. at Zionsville, Pa., are thoroughly sold on the performance of Ammonium Sulphate, both in high-nitrogen complete fertilizers and as a supplementary nitrogen material for direct application.

In their hybrid seed corn operations, the Seem Brothers plow down 700 to 800 lbs. of a 10-10-10 or its equivalent to improve the nutrient level of the soil. At planting time, they add an application of 100-150 pounds of 10-10-10 in the rows. When the crop is well along, the Seem Brothers now also side dress with 300-500 pounds of Ammonium Sulphate as a direct application.

This scientific fertilization program with Ammonium Sulphate has increased the average seed corn yield from a previous 60 bushels per acre to 100 bushels. In addition, test weights are higher and seed quality is excellent.

The Seem Brothers report equally good results from the use of Ammonium Sulphate on seed wheat and barley. From an investment standpoint, the return from the increased yield is many times over the fertilizer cost.

BENJAMIN L. SEEM JOSEPH T. SEEM

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What fertilizer and pesticide personnel should know about

Wage-Hour Law

AS A manufacturer of fertilizers or pesticides, you may have a high annual volume of sales, or your business may be on a modest scale. You may employ a large number of workers, or only a few. In your productive processes, you may utilize complicated techniques or merely mix several basic ingredients. No matter—applicability of the Fair Labor Standards Act does not depend on such factors.

Observance of the Act's provisions is required of any employer with respect to all his covered employees, unless a specific exemption applies. Before considering which of your employees may be entitled to the Wage and Hour Law's benefits, first be sure you know its basic standards. These are:

Minimum Wage Pay—at a rate of not less than 75 cents an hour.

Overtime Pay—at least one and one-half times the employee's regular rate for all hours worked in excess of 40 a work week.

Child Labor—prohibition of employment of children under 16 years of age, with some exceptions.

Coverage Provisions

Most fertilizer and pesticide manufacturers will have at least some employees who are covered by the Act's provisions, which apply to employees who are engaged in interstate commerce or in the production of goods for interstate commerce, including any closely related occupations or processes directly essential to such production.

The manufacturer who obtains materials or ingredients for his products from outside his own state should keep in mind that coverage applies to those of his employees who purchase or order materials from other states, or unload, unpack, check or otherwise handle materials on receipt directly from outside the state, or maintain records on such interstate commerce activities.

Also covered by the Wage and Hour Law are employees who regularly make use of such instrumentalities of interstate commerce as the mails, the telephone and the telegraph for interstate communication while performing their duties, and employees who regularly travel across state lines in the course of their work.

The manufacturer who produces fertilizer or pesticides for use by farmers within his own state exclusively should take particular note of the principles just stated, for they make it clear that the Act's provisions can be applicable to certain of his workers, even though the firm's products are not sold in interstate commerce. He should remember, too, that employees who engage in covered work during any part of the work week are covered by the Act for the entire work week. For example, if in a given work week, an employee who engages in work relating to the order or receipt of materials from outside the state also helps manufacture or mix the local firm's products, he is covered by the Act throughout that week.

If the manufacturer of fertilizers or pesticides sells his products across state lines—either directly or indirectly—all employees engaged in producing them are covered by the Wage and Hour Law. Fertilizers or pesticides may be considered to be produced for interstate commerce not only if the manufacturer himself sells them to an out-of-state purchaser, but if he sells them to a purchaser within the state who in turn sells them in interstate commerce.

Employees are covered if the manufacturer, at the time of production, knows or has reason to believe that any unsegregated part of the fertilizers or pesticides he produces will be sold in interstate commerce. Covered employees would include not only workers who make, handle, or transport the products, but maintenance and watchmen, as well as employees whose work is related to the ordering and receipt of materials or ingredients from outside the state.

Some Exemptions

All covered employees must be paid in accordance with the Act's minimum wage and overtime pay provisions, with the exception of those who come within specific exemptions. The exemption of chief interest to fertilizer and pesticide manufacturers is one the Wage and Hour Law provides for employees engaged in bona fide executive, administrative, professional, or local retailing capacities, or as outside salesmen.

The employer who claims this exemption for any employee should be sure that all requirements for exemption are met. The divisions caution him against such common faults as relying on the employee's job title or payment of a good

salary as sufficient to establish exemption. The employer should understand, too, that the exemption is not designed to apply to bookkeepers, stenographers and similar office employees, nor does it necessarily apply to plant foremen.

The complete tests for exemption are contained in the divisions' regulations, Part 541, issued by the divisions' administrator under his statutory authority to define and delimit the terms for exemption of employees engaged in these capacities. The regulations are available on request to the divisions.

Exemption Requirements

Among basic requirements for exemption are: (1) An executive employee's primary duty must be the management of the enterprise, or of a recognized department or subdivision; (2) an administrative employee must primarily perform office or nonmanual field work of substantial importance to the management or operation of the business; (3) a professional employee must primarily perform work requiring advanced knowledge in a field of science or learning, or perform primarily creative work in an artistic field.

As to sales personnel, a local retailing employee must make local retail sales of goods or services, or perform work immediately incidental to such sales, and an outside salesmen must be engaged to sell, away from his employer's place of business.

For purposes of exemption, it is not necessary that an employee spend every hour of his work week performing duties of a bona fide exempt nature. A 20 per cent tolerance is allowed. To remain within the exemption, an employee in the executive, administrative or professional category may devote not more than 20 per cent of the hours which he himself works in a work week to nonexempt activities. The time devoted to nonexempt work by local retailing employees and outside salesmen may not exceed 20 per cent of the hours worked in the work week by nonexempt employees of the employer.

If an employee's work meets the duties tests for exemption as an executive, administrative, or professional employee, the employer should check to see whether the salary test is met. For the executive exemption, the employee must be paid on a salary basis of at least $55 a week (or $238.33 a month). For both administrative and professional employees, the test is $75 a week (or $325 a month) on a salary or fee basis. There are no salary tests for the local retailing and outside salesmen exemptions.

In the case of executive, administrative or professional employees who are paid on a salary basis of at least $100 a week, there are shorter duties tests for exemption. These tests also are contained in the Administrator's Regulations, Part 541.

Have you ever asked the U. S. Labor Department's Wage and Hour and Public Contracts Division about the provisions of the Fair Labor Standards Act—the Federal Wage and Hour Law? Many manufacturers of fertilizers and pesticides have not. Yet lack of complete and correct information about this law's minimum wage, overtime pay and child-labor provisions is the chief reason why 68 per cent of fertilizer plants investigated by the divisions last year had violated one or more of these statutory requirements. To help the industry attain a better compliance record and thus avoid the risk of costly violations, the editors of FARM CHEMICALS are presenting this article, which was prepared by the divisions.

The Federal Wage and Hour Law does not require that an employee be paid at any particular time. The employer may make his wage and salary payments once a week, or once a month, or at other intervals, provided his payments are made on the regular pay day. What the Act does require is that payments be computed on the basis of hours worked in each work week, standing alone.

Thus, if an employee should work 42 hours in one work week and 38 in the next, he is owed overtime pay for the two hours worked in excess of 40 during the first week—the employer cannot eliminate the obligation to pay overtime by averaging the hours of work over the two weeks.

Before overtime pay can be computed it is necessary to determine the employee's regular rate, since the Act requires payment for overtime hours at not less than one and one-half times the regular rate. Of course, the regular rate may be more than 75 cents an hour, but it cannot be less.

The "regular rate" is defined in the Act to include all remuneration for employment, except for certain specified payments such as some types of bonuses, and certain premium payments for overtime work and for Saturday, Sunday and holiday work. Full details on what payments must be included and what may be excluded in determining the regular rate and computing overtime pay are contained in the administrator's interpretative bulletin on Overtime Compensation, Part 778.

The employer who pays his employees a weekly wage can determine the regular rate by dividing the weekly wage by the number of weekly hours of work, for which the payment was intended to compensate. If the weekly wage is for a specified number of hours in the week, the regular rate will be constant from week to week. On the other hand, if the weekly salary is paid for whatever number of hours are worked in the week, the regular rate may vary from week to week. If salaries are paid by the month, the regular rate may be computed from the weekly salary equivalent—that is, the monthly salary multiplied by 12 divided by 52.

For each hour worked over 40 in the week, the employee is entitled to half the regular rate, in addition to his pay at the regular rate for all hours worked in the week.

Child Labor

The Act sets 16 years as the minimum age for employment in most jobs, with 18 years as the minimum in occupations which the Secretary of Labor has found to be hazardous. Manufacturers of fertilizers and pesticides should note two of the occupations which have been declared hazardous for minors

(Continued on page 60)

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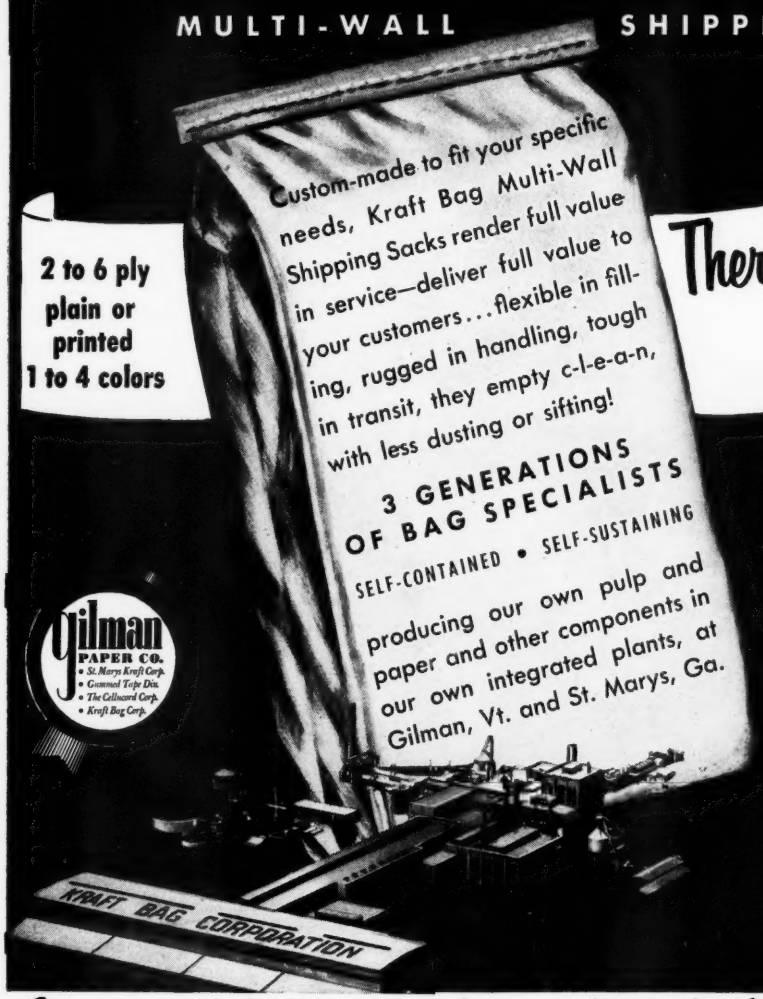
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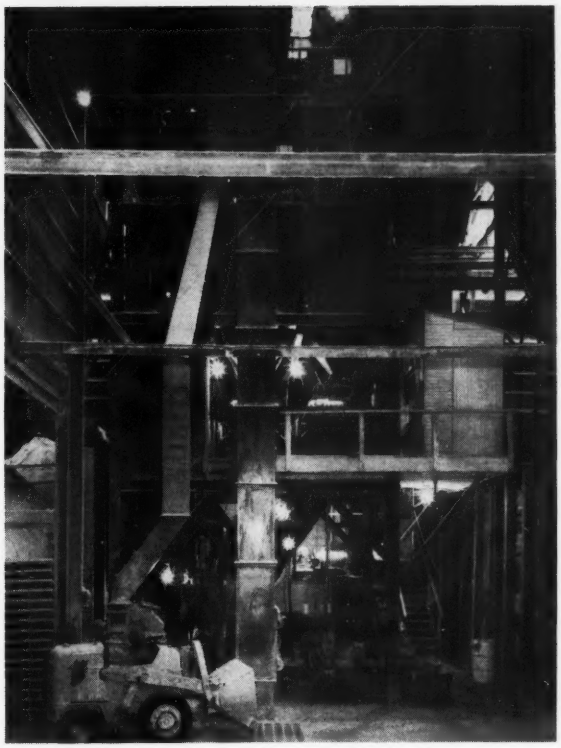
Model of efficiency . . .

New Thurston Plant At Trenton, Missouri



Mixing and bagging units at new Thurston factory shown at right.

AN EXCELLANT example of farm chemicals expansion to serve an agricultural area with necessary plant nutrients is the new Thurston Chemical Co. plant in Trenton, Mo.

The plant, with an annual capacity of 25,000 tons, will serve the rich agricultural area of northern Missouri and southern Iowa.

Officially opened Aug. 9, it is located midway between Kansas City and Des Moines. It is served by the Rock Island railroad and two highways.

A concrete office building houses sales and accounting departments. A direct line teletype is used to connect with the general Thurston offices in Joplin, Mo.

Bag Storage

Bags are stored in a separate building with a capacity of 200,000 empty bags. The plant itself has a structural steel frame with wood sheeting. A center alley runs the length of the building, with 500 ton capacity bins on one side and 250 ton capacity bins on the other.

Efficiency is the keynote of production facilities at the Trenton plant. Covered hopper, box car or truck deliveries can be accommodated by unloading facilities. A standard steel case bucket elevator is used to carry materials to an overhead conveying system. This system consists of shuttle conveyors which can discharge material into any bin in the building.

Batch Weighing

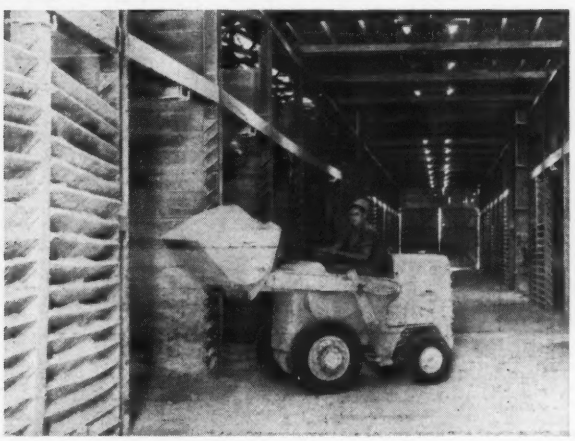
An automatic batch weighing system was supplied to the plant by Inglett and Corley of Augusta, Ga. It was installed with a rated capacity of 30 tons an hour, using a four-man crew. Early reports from Thurston indicate that this capacity has already been exceeded.

Inglett and Corley also supplied bagging equipment, used in combination with the batching unit. Capacity is the same.

Package conveyors carry the bags from the weighing unit to the loading dock where they are stacked or shipped by rail or truck.

The Trenton plant is on a year-round operating schedule. ◆

Efficient and clean loading dock at the new Trenton, Mo., Thurston plant is shown at left. At right, storage bins in new plant show excellent arrangement for quick, easy use. Plant was opened August 9.



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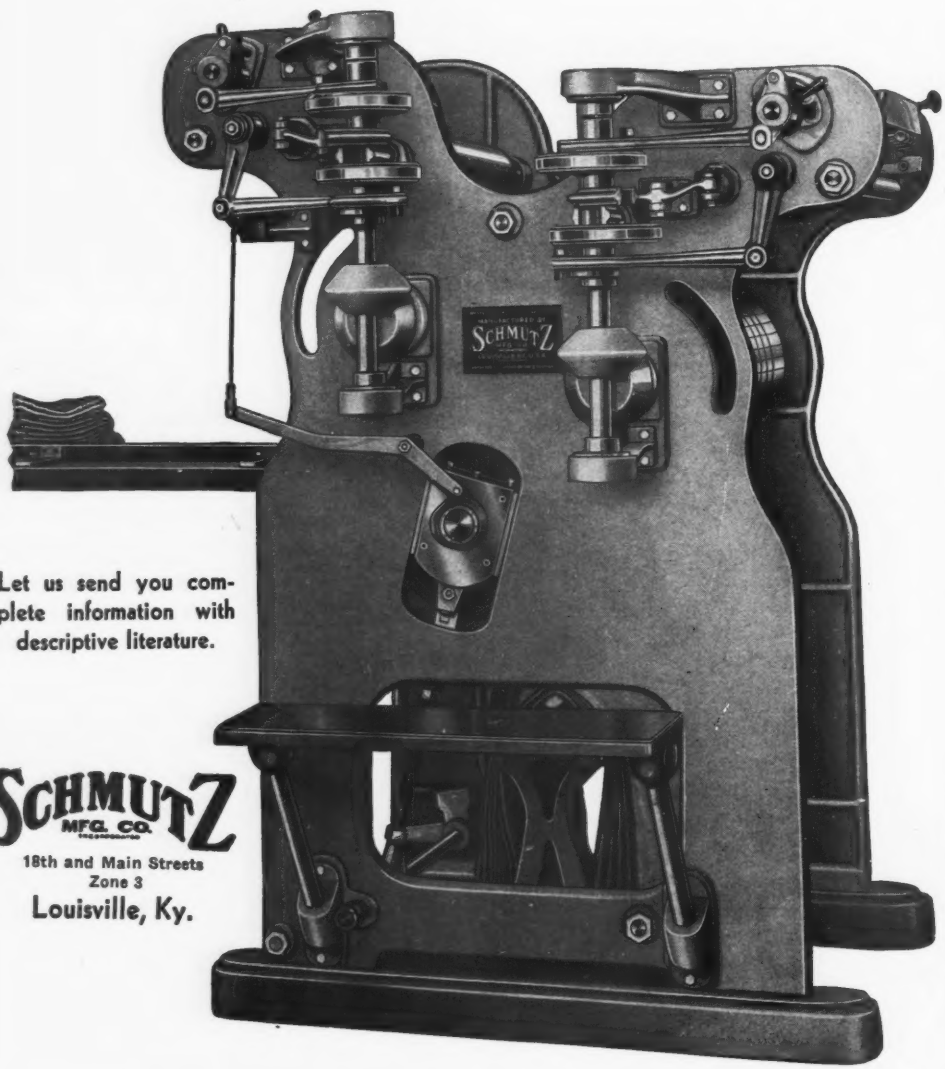

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FERTILIZER MATERIALS MARKET

New York

October 13, 1952

Sulfate of Ammonia

Material is being shipped against previous orders and a good demand is noted in various directions. Some buyers fear a decidedly tight market in the spring when demand is the heaviest. Several large lots of foreign material recently arrived at southern ports.

Nitrate of Soda

This market is rather a routine affair at the present time with stocks ample to take care of demand. No change in price noted.

Ammonium Nitrate

Demand for ammonium nitrate is heavy, with producers unable to fill buyers' demands. Some buying is based on a possible shortage next spring.

Nitrogeneous Tankage

While domestic producers are sold out for the balance of the year, some imported material is offered from time to time at prices ranging from $6.00 to $6.25 per unit of ammonia ($7.29 to $7.59 per unit N). Demand continues excellent.

Caster Pomace

Some domestic producers recently offered material for shipment early next year at the same price as last, $37.25 per ton, f.o.b. production points, and it was well taken by the trade.

Organics

Organic fertilizer materials displayed a firm tone with animal tankage and blood both selling at $8.00 per unit of ammonia ($9.72 per unit N), f.o.b. Eastern shipping points. Some imported cottonseed meal arrived and was sold at prices slightly under the domestic market. A new Government ceiling price was established on soybean meal at $87.00 per ton in bulk, basis f.o.b. Decatur, Ill., but some lots were sold under this price. Linseed meal and the mixes were firm in price.

Fish Meal

With domestic fishing operations in the North pretty well over for this season, the trade will have to depend more on imported material. The market is quoted around $135.00 per ton at the ports for foreign material 60 per cent or better. Recent arrivals of this material have been fairly heavy.

Bone Meal

Under a new Government regulation, effective October 14th, it will not be possible to import either raw bone meal or steamed bone meal high in ammonia. The only bone meal that can come into the country to meet Government requirements will be high grade feeding steamed bone meal that has been heated to necessary temperature. Therefore, the market for this type of material remains very tight.

Hoof Meal

With recent sales on the basis of $7.00 per unit of ammonia ($8.51 per unit N), f.o.b. Chicago, the market continued firm.

Superphosphate

Triple superphosphate still is needed in certain sections, with the supply limited to existing contracts. Regular superphosphate is in much better supply and buyers have had little trouble recently in filling their needs.

Potash

All domestic producers are sold out for their estimated output for the present fertilizer season and shipments are being made against contracts. In view of the increased domestic production, not as much foreign material is expected to arrive during the next few months but if a shortage should develop in the spring, foreign shipments will probably be heavier.

Philadelphia

October 13, 1952

The market continues quiet but there is some concern over the reduced nitrogen production, due to current labor troubles. Sulfate of ammonia is still in rather short supply, but not seriously scarce. Nitrate of soda is in a well balanced position. Blood and tankage are somewhat stronger, and steamed bone is in better demand. The demand for triple superphosphate is quite active. The potash position is normal.

Sulfate of Ammonia.—Supply position is reportedly tight, but the scarcity is not serious. Considerable import material is offered, but price is somewhat higher than domestic contracts. A definite shortage is expected to develop early next year.

Nitrate of Soda.—There is no unusual activity. Demand is normal and the supply fully sufficient.

Blood, Tankage, Bone.—Blood and tankage have picked up some after a short period of weakness. Blood sold at $7.75 per unit ammonia ($9.42 per unit N) at Chicago, and $8.00 per unit ($9.72 per unit N) at New York. Tankage was priced at $8.75 per unit ($10.63 per unit N), Chicago, with the New York price $7.75 per unit ($9.42 per unit N). Steamed bone ranges from $62.50 to $75.00 per ton depending on quality and location, while raw bone is practically neglected. Hoof meal showed some little activity at $7.00 per unit ammonia ($8.51 per unit N) at Chicago.

Castor Pomace.—Supply exceedingly limited with a few sales at $37.25 per ton at the producing plant.

Fish Scrap. — Menhaden meal production is practically all sold on contract, with the end of the fishing season in sight. Any quotations are at full ceiling price of $135.60 per ton.

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are the farm families throughout the nation who buy your products. Many of their production needs are closely related to yours.

Their success in meeting this year's greatly increased food and fiber goals depends to a large extent upon your ability to manufacture and distribute essential supplies of fertilizers and pesticides.

Farm organization leaders, along with their experienced Washington staffs, are constantly presenting factual data on farm operations to key Congressional and Government officials.

Mounting defense production problems clearly show the need for close liaison between leaders in both groups.

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Phosphate Rock.—Calls for deliveries against domestic contracts are active and the supply keeps pretty even with demand. Export quiet.

Superphosphate. — Demand for triple is in excess of present supply. Contract price was recently advanced 4 cents per unit a.p.a. to 91 cents per unit. Normal grade is in easier position as to supply, but still reported tight in some areas.

Potash. — Production is contracted well ahead and demand for shipments is active. Increased production has thus far been readily absorbed.

Charleston

October 13, 1952

Although superphosphate is in fairly comfortable position now, a tight market situation is expected during the late fall and early spring. Potash supplies continue adequate with the possibility of some tightness in the market in the early spring. Hard nitrogen, generally, is fairly adequate in supply but expected to be somewhat short during the late fall and early spring.

Organics.—The market on fertilizer grade organics continues relatively quiet but a limited tonnage of domestic nitrogenous for fall and spring shipment has recently been sold, maintaining domestic producers in a heavily sold position. Prices for domestic nitrogenous tankage range from $4.60 to $5.00 per unit of ammonia ($5.59 to $6.08 per unit N), bulk, f.o.b. production points. Limited supplies of imported nitrogenous tankage are available for fall and spring shipment at around $6.00 to $6.15 per unit of ammonia ($7.29 to $7.47 per unit N) ,in bags, C.I.F. Atlantic ports.

Castor Pomace.—Current production is still priced at $37.25 per ton in burlap bags, or $2.00 per ton less in paper bags, f.o.b. Northeastern production points. This is guaranteed minimum 6.75 per cent ammonia but only limited supplies are available. Imported material varies in price from $40.00 to $45.00 per ton, ex-vessel Atlantic ports.

Dried Blood.—The Chicago market for unground dried blood is around $8.50 per unit of ammonia (10.33 per unit N), f.o.b. Chicago area with the New York market at around $8.00 ($9.72 per unit N). At these prices, prime interest is from feed trade.

Potash.—Demand is improving for domestic muriate of potash against contracts. No recent changes in prices have been announced and most producers are selling at 43 cents per unit, bulk, for 60 per cent grade, f.o.b. Carlsbad, New Mexico.

Ground Cotton Bur Ash.—This excellent source of potash, primarily in the form of carbonate of potash, continues available for prompt and spread shipment at prices approximating the delivered cost of domestic sulfate of potash. Analysis varies from 38 per cent to 45 per cent with an average of about 41 per cent.

Phosphate Rock.—Demand continues active and no heavy stocks of the high-grade are accumulated at Florida mines. Low-grade demand and supply are in balance.

Superphosphate. — Supply conditions are fairly comfortable for the time being and prices remain at ceiling levels.

Sulfate of Ammonia.—Supply situation continues tight with a shortage expected to develop in the late fall and early spring. Domestic producers' prices remain unchanged and imported material ranges in price from $53.00 to $55.00 per ton, f.o.b. cars Atlantic ports, in bulk.

Nitrate of Soda.—Demand and consumption are in seasonal dimensions with stocks adequate and prices unchanged.

Calcium Ammonium Nitrate.—This form of ammonium nitrate testing 20 to 21 per cent nitrogen continues to be offered in 100 lb. paper bags at $51.25 per ton, f.o.b. cars at docks, Wilmington, N. C., Charleston, S. C. and Braithwaite, La., for fall and spring delivery.

Industrial News

New Products **New Plants** **New Appointments**

Grace in Fertilizer Industry With New Memphis Division

Wilson

Dewey

Gilliland

Haslam

Another big expansion in the farm chemicals field was revealed last month with announcement of formation of Grace Chemical Co., a wholly-owned subsidiary of W. R. Grace & Co., international industrial and trading concern.

J. Peter Grace Jr., president of the parent company as well as the newly formed chemical organization, made the announcement. A plant will be built near Memphis, Tenn.

Nitrogen in the form of urea for agricultural and industrial uses will be produced in the plant. The unit will cost approximately $18,000,000. Davison Chemical Corp., of Baltimore, will act as advisor on engineering and other matters during the period of construction.

Prominent industry members have been named directors of the company, including Charles E. Wilson, former president of General Electric Co. and first chairman of the Defense Mobilization Board. Others are Robert T. Haslam, former vice president and director of Standard Oil Co.; Bradley Dewey, president of Dewey and Almy Chemical Co. and wartime U. S. Rubber director and Prof. Edwin R. Gilliland, dean of Engineering at Massachusetts Institute of Technology.

Plant manager will be John Carriere, now manager of the Engineering and Construction division of the Hanford Works of the Atomic Energy Commission's program.

A 277-acre site in the Woodstock area, six miles from Memphis, is the site of the ammonia-urea plant. Ground was broken for the building Oct. 14.

That area was selected because of the present and growing market in the region and the advantages of water and rail transportation. Company officials said the plant will be completed by the summer of 1954.

One of the many Grace subsidiaries, in scores of industries, is the Naco Fertilizer Co., which operates factories in the Carolinas, Florida, Ohio and California.

Pennsalt Names Blanton Southeastern Manager

Pennsylvania Salt Manufacturing Co. has appointed O. Harry Blanton Southeastern District Sales Manager for agricultural chemicals.

Blanton will have headquarters at Montgomery, Ala. He replaces J. Drake Watson, who is on active duty with the Army in Korea.

Since serving in World War II, Blanton has been in agricultural technical service and sales work. He joined Pennsalt as a technical sales representative in that field in June, 1951. He is a native of Nichols, S. C., and was graduated from Clemson Agricultural College with a Bachelor of Science degree.

Ike, Stevenson Laud Industry

FARM CHEMICALS wasn't sure when we went to press who our next president would be (and we weren't going out on a limb with the pollsters) but the magazine is confident he will have a sympathetic attitude toward the job of the fertilizer industry in helping farmers provide more food and fiber for the growing U. S. population.

In statements to the "Fertilizer News," bi-weekly publication of the National Fertilizer Association, General Eisenhower and Governor Stevenson praised the work of the industry.

Said Eisenhower:

"Only through the efficient operation of our private enterprise system can our growing population be fed well and fed cheaply. A cornerstone of this program must be the encouragement of production of low-cost fertilizers by self-reliant manufacturers whose output today accounts for more than a quarter of our farmers' crops."

Highlight of Stevenson's statement was this paragraph:

"The Democratic platform specifically recognizes the importance of and the present need for fertilizer development. It says, 'Great farming areas, particularly of the Mid-West and West, are in acute need of low cost commercial fertilizers. To meet this demand, we favor the opening of the nation's phosphate rock deposits in the West, through prompt provision of sufficient low-cost hydro-electric power to develop this great resource.' "

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Industrial News

Poisons Control Men Discuss New Products

DEVELOPMENT of new insecticides was discussed at the meeting of the Association of Economic Poisons Control Officials in Washington, D. C., Oct. 4.

The topic was aired by Dr. H. L. Haller, assistant chief of the Bureau of Entomology and Plant Quarantine, who said the bureau is working with industry to check insecticidal properties of the new chemical allethrin. Formulations and combinations of allethrin and pyrethrum soon will be available, he stated. Dr. Haller also talked about the problem of nomenclature in the marketing of pesticides and said there is worldwide interest in the subject. A special committee on Phyto pharmacy has been set up to study the problem and recommend a system for coining names.

Better Labeling

More informative labeling of pesticide-fertilizer mixtures also was urged by the officials, who met in the Shoreham Hotel a day after the meeting of the fertilizer control officials. (The fertilizer group also discussed the matter of labeling fertilizer-pesticide mixtures. See story, page 33.) The economic poisons group recommended that when such mixtures are registered with a state agency, the manufacturer be required to identify clearly the pesticidal ingredients on the label of the product.

All states are in agreement that mixtures of fertilizers and pesticides should be registered before they are marketed, according to a report of a committee appointed to investigate the new farm chemical field. The committee issued a caution to fertilizer manufacturers to "make a thorough study of the problems involved" before entering the combination fertilizer-pesticide field.

Would Aid FTC

Help for the Federal Trade Commission to speed its job in fighting fraudulent advertising claims for economic poisons was offered by the group in a recommendation from the committee on state relations. The resolution, which was approved by the officials attending the sixth annual meeting, went to the executive committee for further study.

Another recommendation, now under study by the executive committee, urged study of the suggestion that coloring matter be added to seeds which have been treated with chemicals.

Greater control over applicators of economic poisons and a minimum of legislation concerning the poisons themselves was reported by the legislative committee.

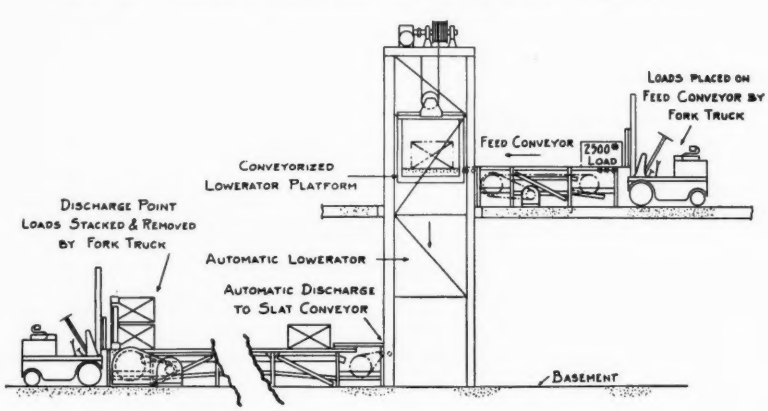
Crass Speaks

M. F. Crass Jr., who also addressed the meeting, discussed labeling of hazardous chemicals. He is secretary of the Manufacturing Chemists Association.

Another talk, by Dr. A. J. Lehman, chief of the division of pharmacology of the Food and Drug Administration, was concerned with toxicity of newer pesticides. He described methods employed by FDA in detecting pesticides in foods.

Rodney C. Berry, of Virginia, was elected president of the group at the one-day session, while Floyd Roberts, of North Dakota, was named vice president. A. B. Heagy, of Maryland, was reelected secretary-treasurer of the organization.

11-1 Automatic Conveyor System


LOADS PLACED ON FEED CONVEYOR BY FORK TRUCK
FEED CONVEYOR
2500# LOAD
CONVEYORIZED LOWERATOR PLATFORM
DISCHARGE POINT LOADS STACKED & REMOVED BY FORK TRUCK
AUTOMATIC LOWERATOR
AUTOMATIC DISCHARGE TO SLAT CONVEYOR
BASEMENT

Farm chemicals manufacturers who face the problem of transporting large quantities of materials between floors might consider installing a Gifford-Wood automatic lowerator-conveyor system.

The new system releases elevators and fork trucks for other work, relieves traffic conditions and cuts work-hours, the company claims.

Three units comprise the lowerator-conveyor: 1. the lowerator, 2. the feeder conveyor and 3. a take-off conveyor. The units are automatically interlocked and controlled by electric eyes and limit switches so that when the feeder conveyor receives a load it delivers it to the lowerator, which in turn descends and delivers the load to the take-off conveyor from which it is removed for storage.

The system can be constructed to fit specific space requirements of various plants. For further information fill out a **Reader Service** card, using number **11-1.**

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Industrial News

Nitrogen Division Will Build Plant

Commercial production of a high analysis fertilizer, using nitric acid in large part for the acidulation of rock phosphate, will be done in a five million dollar plant to be constructed by Nitrogen Division, Allied Chemical & Dye Corp.

The plant, utilizing a process developed by the division in four years of research, will be built at South Point, O.

In the acidulation process, phosphate rock is continually mixed with nitric acid and a small amount of sulfuric acid. The resulting material is ammoniated to neutralize any acids present and to provide nitrogen. Potash salts are added and the product is granulated.

An annual saving of approximately 88,000 tons of 100 per cent sulfuric acid will be made with the nitric process, the division estimates.

Fertilizer produced will have a 12–12–12 analysis, which has been recommended for most midwest soils.

Construction of the plant is scheduled for this month, with contract let to John J. Harte Co., of Atlanta. Goal for completion of the plant is next summer.

Nitrogen will be available for the process from the present South Point plant of the division.

Business Opportunity

Processes for licensing: Production of nitro-phosphate (dry, bagproof, storage-proof) —Low-temperature fused phosphate recovering the flux —Mixed fertilizers granulated, containing organic and inorganic soil building colloids and trace elements—Soil Builder and Conditioner from coal, lignite, peat, organic waste, low-grade phosphate rock, feldspar, lime, trace elements, etc.—Simple plants.—Patents applied for. Address "375" care FARM CHEMICALS, Philadelphia 7.

Commercial Solvents Enlarges Traffic Dept.

To improve efficiency of the organization Commercial Solvents Corp. has enlarged its traffic department at the company's New York office.

Culbreth

Three personnel appointments went along with the reorganization of the department. In charge of the department is O. L. Culbreth, previously located at Terre Haute, Ind. He joined the corporation in 1933. His assistant is R. F. Archer, who also served with the company in its Terre Haute office.

Preston

The marine division has been placed under the traffic division to consolidate movement of raw materials, with T. G. Preston as head. Preston had been in charge of tanker and barge operations, and joined Commercial in 1935.

McCullough

Assistant General Manager in the new setup is E. P. McCullough, who will be located in Terre Haute. He will supervise movement of tank cars operating from seven major plant locations of the company. He has been in the traffic department since 1922.

Safety Information Sought By NSC Fertilizer Group

Information on plant safety programs and accident statistics are being sought in the fertilizer industry by the Fertilizer Group of the National Safety Council.

The group sent a questionnaire to members of the industry.

Industrial News

Huldrum, Irvine Advance At Shell Chemical Corp.

Two promotions of Shell Chemical Corp. personnel were announced last month following resignation of J. G. Frye, formerly sales manager for the Eastern division.

Huldrum

G. W. Huldrum Jr. succeeded Frye and V. C. Irvine moved up to fill Huldrum's former post of Western division sales manager.

Huldrum will supervise sales activities of the Rocky Mountains for solvents, resins and plastics and industrial chemicals. In the western territory, Irvine will supervise sales of ammonia and ammonium sulfate, fertilizers and other chemicals.

Huldrum joined Shell in 1939 after studying at the University of California. He was named district manager of the Detroit sales office five years ago. In 1949 he went to San Francisco as manager of agricultural products for the western division.

Irvine

Irvine started with the corporation in 1934 after being graduated from the University of California. He represented Shell Development Co. on the Toluene Technical committee during World War II.

California Fertilizer Group Set to Meet Nov. 10-12

A full program of speeches and entertainment is planned for the 29th annual convention of the California Fertilizer Association at the Desert Inn, Palm Springs, Cal., Nov. 10–12.

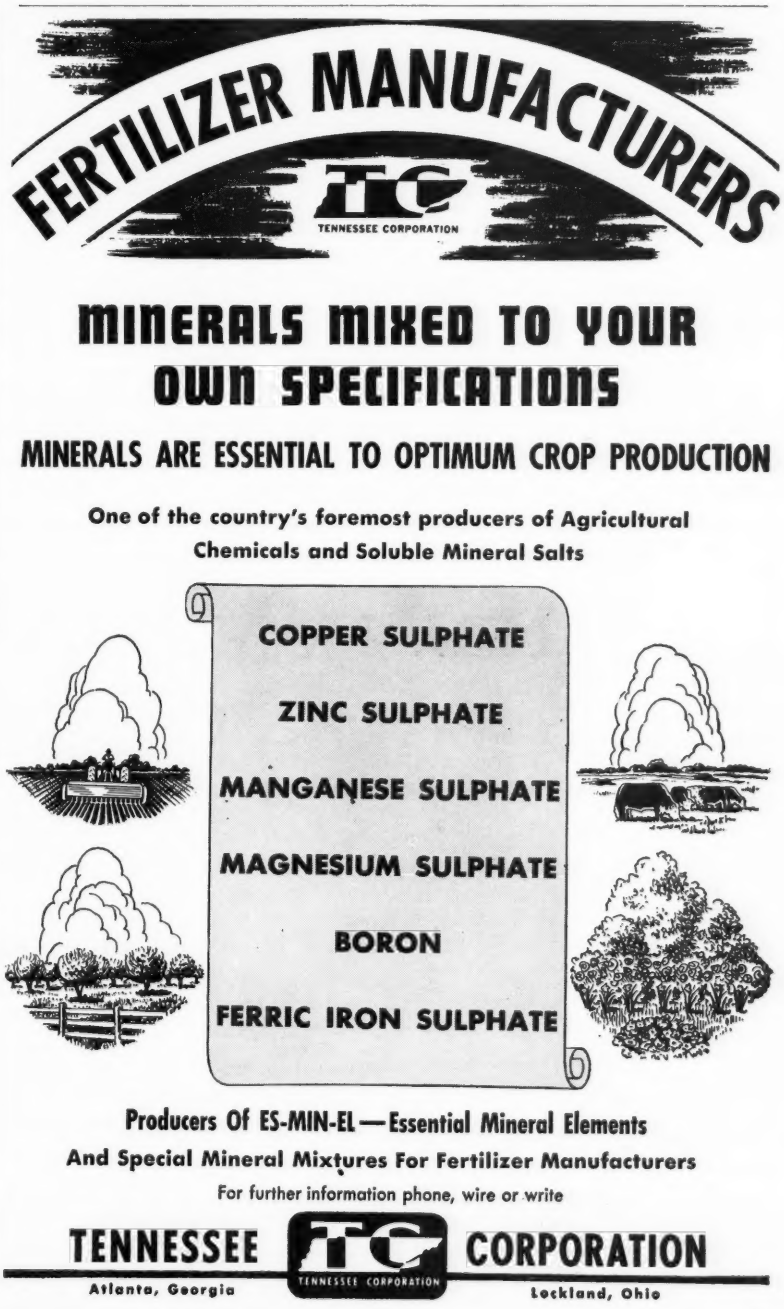
Addresses by Paul T. Truitt and Dr. Russell Coleman, presidents, respectively, of the American Plant Food Council and the National Fertilizer Association are listed on the program, with many others.

Innis, Speiden Sold

The name of Innis, Speiden & Co., Inc. and its resale chemical business has been sold to Berkshire Chemicals, Inc. of New York, International Minerals & Chemical Corp. announced last month.

Main reason for acquiring Innis, Speiden in 1951 was to get the electrolytic plant and facilities at Niagara Falls, N. Y., enablign International to follow its main objective of expanding vertically production of potassium chemicals, according to A. Norman Into, vice president in charge of International's Potash Division.

By using the plant chemical products could be taken from International's mines and put into finished form for industrial consumers, he added.



. . . Wage and Hour Law

(*Continued from page 48*)

under 18—operation of elevators and other power-driven hoisting apparatus, and jobs as motor vehicle drivers and helpers. They may also want to keep in mind that the Act permits the employment of boys and girls of 14 and 15 in office and sales jobs, under strict limitations on hours and working conditions.

The employer who hires young workers can avoid unintentional violations of the Act's child-labor provisions by obtaining an age certificate for each young person, showing him to be at least the age required for his employment. Age certificates usually are issued by the state labor or education department, or a local school official.

Keep Records

Under the Act, employers are required to keep records on wages, hours and certain other specified items that most employers keep for their own information. No special form or order for the records is necessary. The records that are to be maintained for exempt employees differ somewhat from those required for employees who are nonexempt. Complete information on what data should be recorded is contained in the Administrator's Record-Keeping Regulations, Part 516.

These records must be available for inspection by authorized representative of the divisions.

It is a sound dollars-and-cents proposition for every fertilizer or pesticide manufacturer to be sure that he is complying with the Act. Most employers who have had to make unexpected payments of back wages due their employees have found themselves in this situation because they did not keep themselves fully informed about the statutory requirements.

Under the Wage and Hour Law, employees may bring suit to recover back pay and liquidated damages equal in amount to the wages withheld, together with attorneys' fees and court costs. On the written request of employees, the Secretary of Labor, too, may bring suit against employers to recover back wages. However, employees who consent to suit by the Secretary in their behalf waive their own right to sue for back pay and damages.

In addition, the divisions' administrator may supervise the payment of back wages for employees, under certain circumstances.

Further Information

Simplest way to avoid inadvertent violations of the Fair Labor Standards Act is to consult the U. S. Labor Department's Wage and Hour and Public Contracts divisions on all points in doubt. Inquiries are answered by mail, telephone or in person-to-person interviews at any regional or field office. Regional offices are located in Boston, New York, Philadelphia, Birmingham, Cleveland, Chicago, Kansas City, Dallas, San Francisco and Nashville. ◆

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Industrial News

Nitrogen Expansion Good, Advisory Group Tells NPA

The nitrogen industry is ready for all emergencies, including war.

Producers of the vital chemical told the National Production Authority last month current and projected expansion of nitrogen capacity will be sufficient to meet agricultural, industrial and military needs in the event of full mobilization.

The assurance was given at a Nitrogen Industry Advisory Committee meeting in Washington Oct. 2. The optimistic report included the statement that expansion completed and projected could exceed the government's goal of 2.93 million tons of nitrogen by 1955. Production for 1951–52 totaled 1,800,000 tons.

Three Reasons

Committee members gave three reasons for their views:

1. The industry is building all the plant capacity possible under existing conditions of material and equipment supply.

2. Plant expansion is scheduled to increase by approximately 300,000 tons of N a year to 1955 and the rate of expansion could be increased more rapidly in the event of an all-out emergency.

3. Rated plant capacity usually is considerably less than actual

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Urea Products

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Nitrogen Division products are the result of more than 60 years of experience. They are backed by an enviable reputation for high standards of product quality, enterprising research and reliable, dependable service.

Nitrogen Division was formed June 1, 1952, by combining the Sales Agency Department of Barrett Division and the Nitrogen and Organic Sections of Solvay Process Division, Allied Chemical & Dye Corporation.

From its predecessors, Nitrogen Division inherited productive capacity, skilled personnel, long experience and an outstanding record of performance.

In addition to manufacturing uniform, high-quality products which exceed rigid specifications, Nitrogen Division devotes extensive facilities to the efficient distribution and effective utilization of these products.

Rapid, low-cost delivery is assured by the central locations of the two great Nitrogen Division plants at Hopewell, Virginia, and South Point, Ohio, supplemented by warehousing of some products at stock points conveniently located near markets.

Sales are handled by the offices listed below. In addition to experienced sales personnel, Nitrogen Division maintains a staff of technical experts whose services are available to customers without charge.

Nitrogen Division

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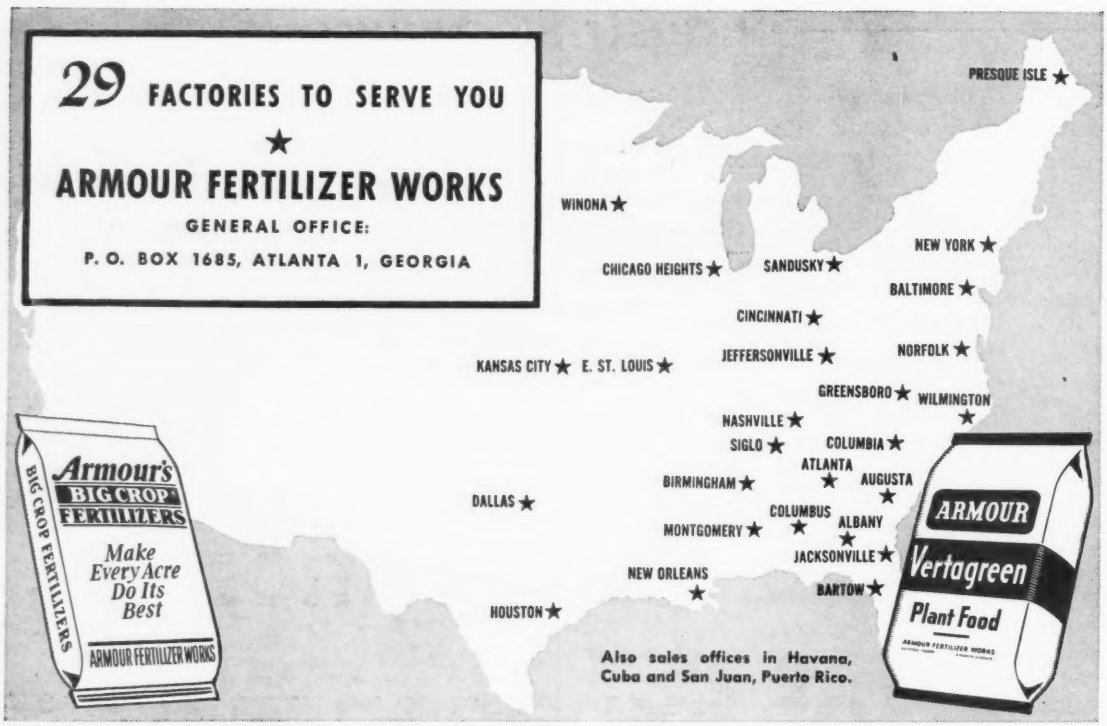
Richmond 19, Va. • South Point, Ohio • Hopewell, Va. • Columbia 1, S. C. • Atlanta 3, Ga. • San Francisco 3, Cal.



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production because of process improvements, removal of plant bottlenecks and improvements in plant efficiency.

According to announced industry plans, the committee said, the U.S.D.A.'s suggested 1955 requirement of 690,000 tons of nitrogen in solid forms would be achieved by the industry.

Industry information and requests for certificates of necessity for rapid tax amortization indicate that the supply of solid nitrogen materials will total 747,350 tons annually by 1955.

Construction Started

NPA said construction on 10 of the first group of 13 plants certified under the nitrogen expansion goal already has been started. One plant is complete and construction on the 13 plants as a group is approximately 26 per cent complete, NPA stated. Construction on six of the second group of 12 plants has been started, with one plant nearly completed, the National Production Authority added.

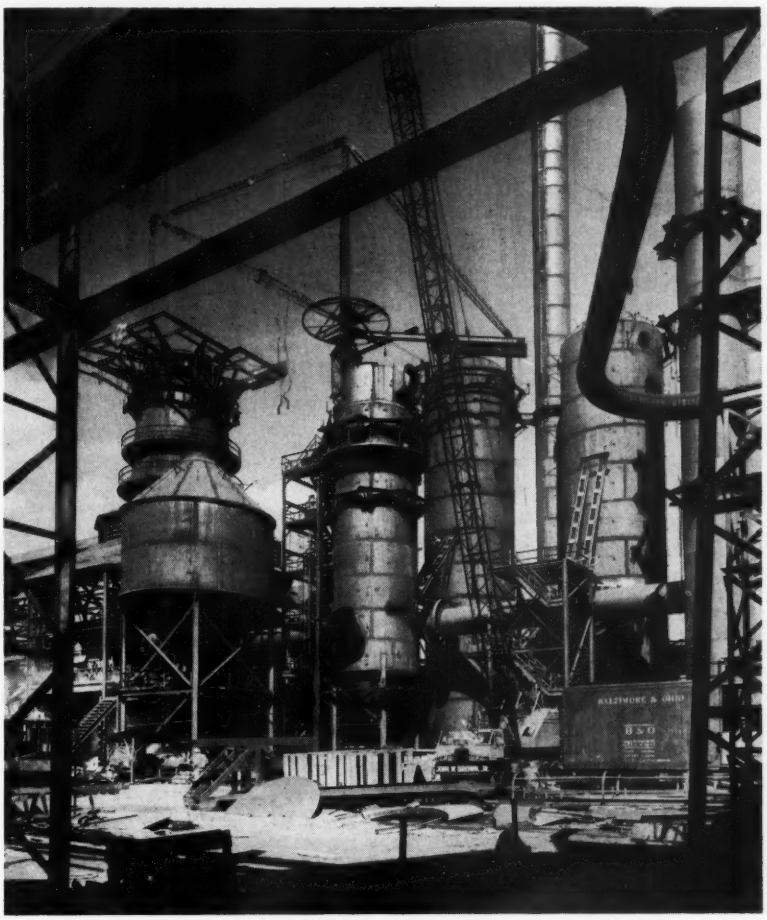
The committee recommended to NPA that new nitrogen production, incidental to the nitraphosphate expansion program, be included as part of the nitrogen goal and that no replacement be made if the total expansion of nitrogen production in both programs exceeds the established goal for nitrogen.

Suggested Goals

Following are the suggested U.S.D.A. goals, indicated supply, and number of conversion facilities recommended or certified in the 1955 expansion program: ammonium nitrate—160,000 tons, 255,-500 tons, nine; ammonium sulfate —110,000, 55,250, six; urea—175,-000, 258,100, eight; ammonium phosphate—65,000, 55,000, five; nitraphosphate—175,000, 118,000, seven (including one unassisted expansion) and other solids—5,000, 5,500, one.

Indicated supply in thepreceding figures is based on information in tax amortizations as filed before Sept. 22, 1952.

Pittsburgh Adds 35 Coke Ovens



Site of new blast furnace under construction at Pittsburgh Coke & Chemical Corp. It will use coke from 35 new ovens recently added at the Neville Island plant of the corporation. Shell of furnace is in left background, behind the conical bin.

Production of many farm chemicals w ll be benefited by installation of 35 new coke ovens, recently installed at the Neville Island plant of Pittsburgh Coke & Chemical Co.

The coke ovens reached full operation last month, marking the first step in a $20 million expansion at the island plant, five miles down the Ohio River from Pittsburgh, Pa.

Gases collected from the coking process are the source of many chemicals used in many industries. Among them are powerful insecticides produced by the Agricu!-tural Chemical Division of the organization.

The new ovens cost $6 million and give the company a total of 140 by-product ovens.

Other expansion plans include new $3 million facilities for production of 2,4-D and 2,4,5-T, which will expand the activities of the agricultural division. The combined plant for the selective herbicides soon will be in operation, according to R. M. Marshall, president of Pittsburgh Coke & Chemical Company.

He said new chemical plants planned by the company will present further opportunity for the upgrading of the company's coke by-products. For example, 2,4-D comes from phenol, which comes from tar liberated in coking.

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The result of 30 years of extensive cooperative research with agronomists and expert soil technologists.

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Nitrite Nitrogen
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Available Phosphorus
Chlorides
Sulfates
Iron
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Manganese
Magnesium
Aluminum
Replaceable Calcium

Tests for Organic Matter in Soils, and Nutrient Solutions, (hydroponics) furnished only as separate units.

(Illustration) Combination Soil Testing Outfit.

Tests for:
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Phosphorus
Potassium
Nitrates
Also used for
Plant Tissue
Tests

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STEDMAN

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All S[illegible]

Bat[illegible]
D[illegible]

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Scr[illegible]

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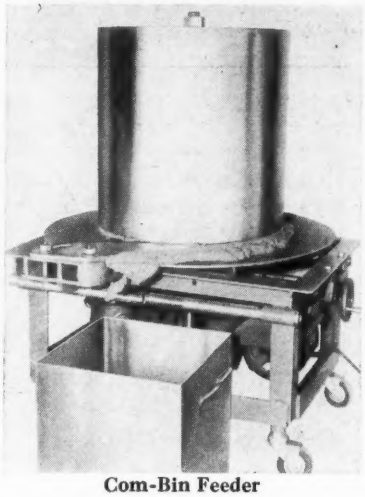
Industrial News

11-2 New Feeder



Com-Bin Feeder

For fertilizer manufacturers who are confronted with difficult feeding problems, Pulva Corp. has a new Com-Bin Feeder which feeds uniformly any stick or plastic material, including fertilizers.

By using the feeder, the problem of removing packed materials from hoppers or bins is overcome, the company states.

Accuracy from minute to minute will not vary more than two per cent as long as the cylinder is at least ¼ full, according to literature on the feeder.

It consists of a cylindrical shell mounted concentrically on a rotating shaft by means of spider arms. Below the cylinder, mounted on the same shaft, is a circular plate larger in diameter than the cylinder. A gap between the plate and the bottom of the cylinder is varied to suit the material being handled.

As the cylinder and plate rotate, the plow continually removes a stream of material from the bottom of the mass in the cylinder, discharging it off the edge of the plate. Discharge rate can easily be varied. For further information, fill out a **Reader Service** card, using number **11-2.**

Stockholders Approve Mathieson-Squibb Deal

Stockholders have given "overwhelming and favorable response" to the merger of E. R. Squibb & Sons into Mathieson Chemical Corp., Thomas S. Nichols, president of Mathieson reported.

According to the report, stockholders representing 83 per cent of the Mathieson common stock and 88 per cent of the Squibb stock favored the merger at meetings of the companies.

Only six-tenths of one per cent of Mathieson stock and one-half of one per cent of Squibb stock voted against it.

Squibb will operate as a division of Mathieson. Legal and financial details of the merger were completed in less than three months. Terms call for Mathieson to be the surviving corporation. It will have an authorized capital of 250,000 shares of preferred stock and 7,000,000 shares of common stock. Each share of Squibb common stock will receive three-fifths of a share of Mathieson common stock. Accordingly, outstanding common stock of Mathieson after the exchange will total 5,439,930 shares.

Mathieson Alters Setup with Merger

S. L. Nevins

A new operational setup for Mathieson Chemical Corp. following acquisition of E. R. Squibb & Sons has been announced by Thomas S. Nichols, president of Mathieson.

Four major divisions of the expanded company will include all operations, sales and development activities. Divisions and their heads are as follows: Mathieson Development Co., Carl F. Prutton; Mathieson Industrial Chemicals Co., Donald W. Drummond; Mathieson Agricultural Chemicals Co., S. L. Nevins and E. R. Squibb & Sons, Theodore Weicker Jr.

Nichols is chief executive officer of the drug and pharmaceutical divisions under the new plan.

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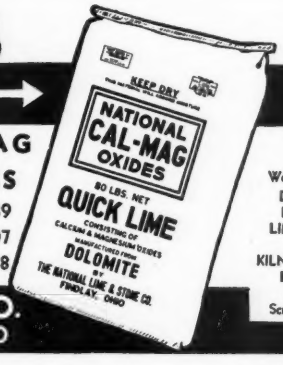

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Capacities 1 to 50 Tons Per Hour
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Dictionary of Fertilizer Materials & Terms
A reference booklet for all who are interested in the manufacture and use of chemical fertilizers. It's "priceless" to agricultural chemists and fertilizer salesmen.
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ATLANTA UTILITY WORKS EAST POINT, GA.

Industrial News

Industry Tagged Element Committee Discontinued

"The research program is going so well that support by the committee no longer seems to be essential." That was the statement of Dr. Vincent Sauchelli, of Davison Chemical Corp., in regard to discontinuing of the Industry Committee on Radioactive and Tagged Element Research.

Sauchelli Chairman

Dr. Sauchelli was chairman of the committee, which was organized six years ago to consider using radioactive phosphorus in soils, fertilizer and plant nutrition research.

The Agricultural Research Administration and cooperating states conducted such research with the financial and technical support of the industry committee.

Now, said Dr. Sauchelli, the industry committee is being discontinued.

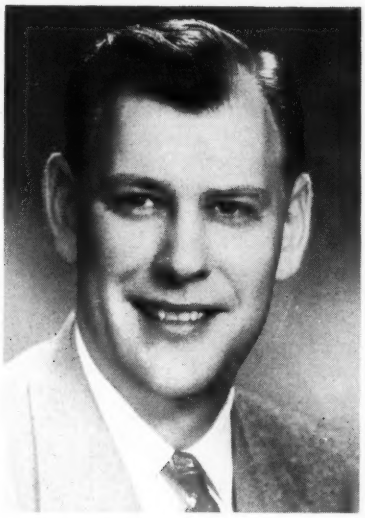
He praised it as "an indication of the effective manner in which industry funds through timely grants may be used to initiate and stimulate a larger research program."

Fertilizer Funds

From 1947–1952, 42 fertilizer companies contributed $84,600 for the work of the committee, 20 companies giving $1,000 or more.

FARM CHEMICALS reported results of several of the fertilizer experiments with radioisotopes in several issues of the magazine earlier this year.

Spencer Promotion



Ervin W. Segebrecht

Spencer Chemical Co. has named Ervin W. Segebrecht assistant director of sales development.

Temporarily he will serve also as manager of the Spencer market research section.

Experienced in research and marketing with Armour and Company, Segebrecht will have similar responsibility with Spencer. He joined Armour in 1938 as a research worker and in 1943 was named group leader of applied research. Segebrecht was appointed sales manager of the Armour Chemical division in New York in 1949.

Spencer also announced opening two new district sales offices to further its long-range plan of decentralization for improved customer service.

A new North-Central section will have offices in Chicago, with S. R. White as head and a Mid-South branch will be located in Memphis, with W. E. Hubbard in charge.

White joined Spencer in 1946 as credit manager in St. Louis. He served as a sales representative in Missouri, Kansas, Arkansas, Illinois, Kentucky and Indiana.

Hubbard has experience with state extension services and experiment stations. He started with Spencer three years ago after leaving Barrett division, Allied Chemical & Dye Corp.

Conference on Conditioners Scheduled for Nov. 10

Billed as a meeting to "clarify the situation through a frank and open discussion of all scientific information available," the "First National Soil Conditioner Conference" has been scheduled for Nov. 10 in the Hotel Plaza, New York City.

Richard A. Snelling, president of Henry A. Dreer, Inc., a soil conditioner manufacturer, is listed as temporary chairman for the meeting.

He said chemical manufacturers, government officials, representatives of the Federal Trade Commission and other interested persons had been invited to attend the one-day meeting.

Snelling and others interested in the field are scheduled to speak.

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YOUR FERTILIZER

THE JAITE COMPANY

"Manufacturers of Paper and Paper Bags"

JAITE, OHIO

"IT'S IN THE J BAG"

SINCE 1905

Industrial News

. . . Chapman Chem.

(*Continued from page 31*)

man and its production manager, describes the facilities as set up for "highly mechanized production."

Agricultural Entry

Organization of the Agricultural Chemicals Division of the company by R. C. Harnden, in 1946, was hailed as another high point in the company's history.

Here, too, research plays a prominent role. In the production of the farm chemicals, a large, fully equipped dust plant is available. The unit has ribbon blenders with modern spray devices for spraying liquid insecticides on to the dust base. The blender is connected to mills which disperse and grind the dust concentrates.

Two Mills for Grinding

Two high speed Hammermills do the grinding. They are equipped with a complete air-conveying system for transporting raw materials without further handling. Other machinery includes two blending mixers of 3,600-pound capacity and two automatic valve bag packers.

For the melting of highly corrosive technical insecticides, prior to their use in dust concentrates, nickel-clad and fully steam-jacketed kettles are employed. An integral spray system is formed by use of high speed filters.

Included in the company's formulations of pesticides are BHC, DDT, 2,4,5-T, toxaphene, aldrin, dieldrin and chlordane. A broad research program coordinates formulating and marketing of the products.

Under the supervision of Dr. E. A. Behr, vice president, a research lab is maintained for control of manufacturing problems and development of new and better methods of using existing insecticides and fungicides. A continual program of research for better products also is part of the laboratory work, according to Dr. Behr.

Pentachlorophenyl wood preservative solutions are leading products of Chapman Chemical. They are used to kill termites and stop rot. Other trade-marked products for the lumber industry include Permatox 10S, Ambrocide and Ambrite for controlling wood-eating insects such as Ambrosia beetles.

A pilot plant is operated in conjunction with the research program. ◆

Advisory Group Urges End of Sulfur Restrictions

All restrictions on the use of sulfur except the reporting system should be removed according to the recommendation of the Sulfur Industry Advisory Committee to the National Production Authority. It was made Oct. 6 at a meeting in Washington, D. C.

Lifting of price controls on sulfur to spur development of additional sources of sulfur also was requested by the committee. It asked NPA to petition the Office of Price Stabilization to drop the controls.

NPA estimated sulfur consumption for 1952 at 6,090,000 long tons. A representative of the Bureau of Mines estimated total supply at 6,524,000 long tons, indicating a 434,000 tons increase in sulfur inventories in the hands of producers and consumers.

Comparable estimates for 1953, which were agreed to by members of the committee were consumption, 6,637,000 long tons; total supply, 7,000,000 long tons, with an indicated inventory increase of 363,000 long tons.

Davison Manager

Dr. Wayne T. Barrett

New manager of the research and development division of Davison Chemical Corp. is Dr. Wayne T. Barrett.

Dr. Barrett formerly served with Phillips Petroleum Co. and the Mellon Institute, where he was junior fellow in catalytic research.

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. . . Systox

(*Continued from page 13*)

fection (Photos, page 12).

Method of Control

Three additional tests were set up to determine the manner in which nematodes were controlled, that is, whether Systox was acting as a contact poison or as a systemic nematocide. For the first of these experiments egg masses of the root-knot nematode were placed in Systox solutions at various concentrations. Daily examinations of these with the dissecting microscope revealed that no hatching occurred during a one-week soaking period.

Larvae which had already hatched were paralyzed. Hatching occurred normally in the untreated controls. When egg masses were taken out of the Systox solution and placed in tap water some hatching took place in 24 hours. Egg masses taken from the Systox solution and placed in pots of soil with tomato seedlings, caused severe infection in 39 days.

It is concluded from this test that Systox did not kill the eggs and had little effect on them other than inhibition of hatching.

For the second test tomato seedlings were allowed to absorb Systox from treated soil and were then transplanted to root-knot infested soil and allowed to grow for 35 days. An examination of root systems at the end of this period revealed that there was no detectable difference in amount of root-knot infection between treated and untreated tomato seedlings. All were moderately infected.

For the third test, tomato seedlings already infected with root knot were allowed to absorb Systox from treated soil. Examinations of their root systems several weeks later showed again that Systox was wholly ineffective as a systemic nematocide.

Not A Growth Stimulant

Another experiment was set up using non-inoculated soil to determine if there was any stimulation from Systox which would account for the better growth observed in seedlings grown in soil drenched with concentrations of .05 and .1 per cent. Cucumber seedlings were grown in pots of sterile soil drenched with Systox at these concentrations and compared with seedlings grown in untreated controls. Cucumber seedlings planted in treated soil did not show any significant growth differences from those grown in untreated soil.

To determine possible toxic residues of Systox in edible fruit a separate experiment was carried out. Cucumbers were harvested from seedlings which had grown in four-inch pots of sterile soil drenched with 300 ml. of Systox solution at concentrations ranging from .1 to .2 per cent. Only cucumbers from the .19 per cent treatment were analyzed and were found to contain .3 ppm of an anticholinesterase inhibitor, presumably Systox, and therefore could not be used for food.

In view of these findings it must be emphasized that at present Systox cannot be recommended for control of nematodes for the following reasons:

(1) It is not effective as a systemic nematocide,

(2) Egg masses of the root-knot nematode apparently were not injured even when soaked in solutions of Systox for one week,

(3) Although effective as a soil drench, high application rates were necessary. Control in this case probably was due to both inhibition of hatching and paralysis of hatched larvae in the soil,

(4) Presence of a toxic residue in harvested cucumber fruit. ◆

Injunction Issued Against Conditioner

Legal action in the soil conditioner field was in the spotlight again late in October with the issuance of a permanent injunction against Acrylium Corp. of Glen Cove, N. Y.

The injunction prohibits the corporation from using the word "Acrylium" as a trade mark or company name. It was issued by the United States District Court for the Eastern District of New York at Brooklyn as a result of a suit filed in July by Monsanto Chemical Co.

The injunction applies also to Oscar and Raymond Zurer as individuals and as partners doing business under the name Long Island Paint and Chemical Co., which manufactured and distributed a conditioner under the trade name "Acrylium."

Monsanto charged infringement on its trade mark "Krilium," first product in the field last December. The company claimed similarity of the names was confusing and misleading and constituted unfair competition.

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Fertilizer Abstracts

(*Continued from page 41*)

phosphate rock, as the high *p*H makes possible the formation of calcium carbonate when the carbon dioxide is introduced into the slurry. All the calcium nitrate is transformed into calcium carbonate and ammonium nitrate.

"Superphosphates by Acidulation of Rock Phosphate With Mixtures of Sulfuric and Phosphoric Acids and With Phosphoric Acid Alone." L. D. Yates and F. T. Nielsson. Tennessee Valley Authority, Wilson Dam, Ala., and E. J. Fox and R. M. Magness, U. S. Dept. of Agriculture, Beltsville, Md.

—

Over a period of years there has been considerable interest in the acidulation of rock phosphate with mixtures of sulfuric and phosphoric acids and with phosphoric acid alone in ordinary superphosphate equipment. The higher grades of superphosphate thus obtained are needed in the formulation of high-analysis mixed fertilizers, for which there is an increasing demand.

The use of phosphoric acid, either with or without sulfuric acid, in manufacturing facilities designed for sulfuric acid treatment was re-emphasized by the Atomic Energy Commission's recent proposal to increase the production of phosphoric acid for uranium recovery. At the request of the Atomic Energy Commission, a study of the production of superphosphates containing 28, 33 and 45 per cent available P_2O_5 was undertaken cooperatively by the U. S. Department of Agriculture and TVA. The work is still in progress.

In small-scale experiments 12-pound batches of Florida land pebble (88 per cent—100 and 57 per cent—200 mesh) were acidulated in a change-can mixer at various temperatures and acid concentrations. The conversion of the rock P_2O_5 to available forms during a 24-hour denning period varied from 95 per cent for ordinary superphosphate to 85 per cent for triple superphosphate. The period of fluidity in the acidulate made with mixed acids was greater than with single acids. Limited reaction during the initial stage, indicated by longer periods of fluidity, had little or no effect upon the extent of reaction 24 hours after mixing.

"Partial Replacement of Sulfuric Acid with Nitric Acid in Making Superphosphate." David McKnight, J. F. Anderson, Jr., M. M. Striplin, Jr. and T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.

—

When rock phosphate was acidulated with mixtures of nitric and sulfuric acid containing approximately 30 per cent water, the product solidified and after 10 to 30 minutes it was a friable solid resembling fresh superphosphate. About half of the sulfuric acid required to make ordinary superphosphate was replaced by nitric acid. Two days' curing time was required to develop maximal P_2O_5 availability which was 98 per cent when the acid-rock ratio was equal to that stoichiometrically required to convert all the calcium in the rock to calcium sulfate, monocalcium phosphate and calcium nitrate.

After curing, the product was ammoniated in a drum mixer with anhydrous, gaseous ammonia. A typical product contained six per cent nitrogen and 18 per cent available P_2O_5. About 30 per cent of the P_2O_5 was in water-soluble form. The product appeared to have satisfactory physical properties and did not require drying.

Unlike previously developed processes that use nitric acid for acidulating rock phosphate, the present process may be carried out in equipment similar to that used for producing and ammoniating ordinary superphosphate. Either a batch, pan-type mixer or a continuous, funnel-type mixer was satisfactory for carrying out the acidulation step.

The results are considered to be technically and economically promising. Development of the process on a pilot-plant scale is being continued.

"Determination of Source and Distribution of P_2O_5 in Triple Superphosphate by Radioactive Phosphoric Acid." G. L. Bridger and J. W. Markey, Department of Chemical and Mining Engineering, Iowa State College, Ames, Iowa

—

Experimental triple superphosphates were made by mixing Florida rock phosphate with phosphoric acid containing a small proportion of radioactive phosphorus. Wide

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ranges of acidulation and acid concentration and a number of curing conditions were used. The relative proportions of P_2O_5 from the acid and from the rock were determined in the water-soluble, citrate-soluble and citrate-insoluble fraction of the superphosphates by measuring their radioactivity.

Under ordinary curing condition (in open containers at room temperature), 96 to 98 per cent of the P_2O_5 from the acid was in the water-soluble fraction, 2 to 4 per cent in the citrate-soluble fraction and none was in the citrate-insoluble fraction. In the water-soluble fraction, the ratio of acid P_2O_5 to rock P_2O_5 was about 2.6, somewhat in excess of that required for monocalcium phosphate formation, which indicated the presence of other compounds formed by reaction with the acid. The citrate-soluble fraction consisted of a portion containing both acid P_2O_5 and rock P_2O_5 (possibly iron and aluminum phosphates) and a larger portion containing rock P_2O_5 only, possibly β-tricalcium phosphate. The citrate-insoluble fraction consisted of unattacked rock phosphate and, in some cases, reverted rock P_2O_5; acid P_2O_5 was never present in the citrate-insoluble fraction.

Curing of the superphosphates under other condition of temperature and moisture content altered the relative distribution of P_2O_5 in the various fractions. However, as with normal curing, acid P_2O_5 was not found in the citrate-insoluble fraction.

"Chemical Method for Available Fertilizer Nitrogen in Urea-Formaldehyde Compositions." W. A. Morgan and R. D. Kralovec, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

—

New fertilizer compositions prepared by controlled reaction of urea with formaldehyde supply slowly available nitrogen of high agronomic value.

A simple, rapid and reproducible method was developed which furnishes an index of this availability. The new technique is superior to existing methods and shows a close correlation with time-consuming soil nitrification tests. The procedure requires two determinations:

(a) nitrogen insoluble in cold water in accordance with the official method of the Association of Official Agricultural Chemists, ("Methods of Analysis," A. O. A. C., 7th ed., p. 15, 2.34, 1950), and

(b) nitrogen insoluble in a hot buffered phosphate solution determined on a duplicate sample. The second analysis requires the use of a fixed weight of the urea-formaldehyde composition. Availability is the quantity of insoluble nitrogen which dissolves in the hot buffered solution, expressed as a percentage of the cold water-insoluble nitrogen $(\frac{a-b}{a} \times 100)$.

In mixed fertilizers containing urea-formaldehyde products as the only source of slowly available nitrogen, determination (a) is adequate for estimating the urea-formaldehyde content. In fertilizers which also contain other forms of slowly available nitrogen, such as natural organic products, the concentration of urea-formaldehyde polymer is established by measuring the total formaldehyde obtained on distillation from phosphoric acid solution.

"Effect of Solubility of Phosphate Fertilizers on the Yield of Vegetable Crops." F. T. Tremblay, Western Washington Agricultural Experiment Station, Puyallup, Wash., and K. E. Baur, Pacific Supply Cooperators, Portland, Ore.

—

During 1948–50 a number of annual vegetable crops were fertilized with rock phosphate, defluorinated rock phosphate, calcium magnesium phosphate glass and superphosphate. The use of superphosphate resulted in substantially higher yields than were obtained when the other water-insoluble phosphates were used.

The use of ammonium citrate-soluble materials, defluorinated rock phosphate and calcium magnesium phosphate glass, resulted in higher yields than was obtained from the use of rock phosphate which is largely insoluble in ammonium citrate.

In 1951 studies with vegetable field trials were enlarged to include some of the other phosphate sources. On basis of yield data obtained, the phosphate sources studied fall into the following sequence: diammonium phosphate = concentrated superphosphate > nitrophosphate (12–32–0) = ammoniated superphosphate (high solubility) > nitrophosphate (17–22–0) = calcium metaphosphate = ammoniated superphosphate (low solubility, = fused rock phosphate = dicalcium phosphate > rock phosphate.

The results obtained in these studies indicate the need of a critical reexamination of the relative values of water-insoluble and water-soluble phosphates for rapidly growing vegetable crops grown under the soil and climatic conditions that prevail in western Washington. ◆

(Complete text of selected papers from this meeting will be presented in future issues of FARM CHEMICALS.)

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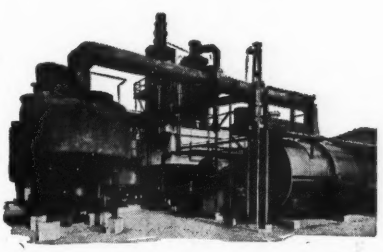

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of FARM CHEMICALS, published monthly at Philadelphia, Pa., for October 1, 1952

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A. A. WARE, Editor.

Sworn to and subscribed before me this 15th day of Sept., 1952

A. F. WALSH
Notary Public

(My commission expires March 5, 1953.)

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Southwest Potash Corp., New York City
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Potash Co. of America, Washington, D. C.

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Spraying Systems Co., Bellwood, Ill.

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SULFATE OF AMMONIA
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
United States Steel Corp., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Texas Gulf Sulphur Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
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International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TEPP
Monsanto Chemical Co., St. Louis, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.

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Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.

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Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
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UREA & UREA PRODUCTS
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
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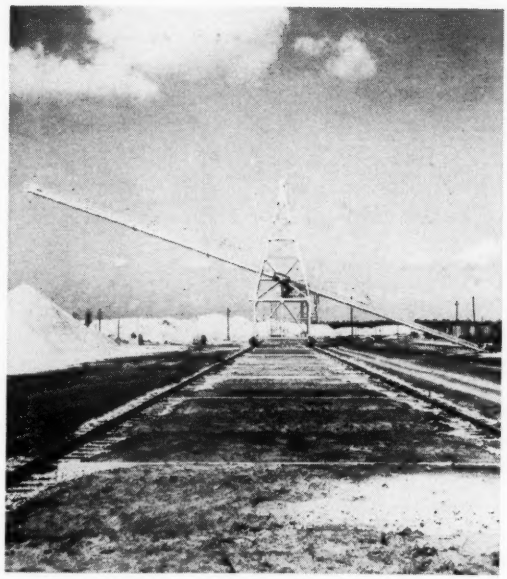
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.



For phosphate rock . . .

Traveling Stacker

IT'S AN ill wind that blows no good. It was continual ill winds which spurred development of a novel traveling stacker for phosphate rock by Hewitt-Robins, Inc.

The traveling stacker, specially built for the Coronet Phosphate Company, Plant City, Fla., is designed to withstand high winds that are frequent in that section of Florida and which sometimes reach hurricane force.

Provides Storage Pile

It is used to provide a storage pile of washed phosphate rock received from the processing plant.

Here's how it works:

The phosphate is delivered to the lower end of a 253-foot inclined belt conveyor, mounted on the stacker frame.

The conveyor elevates the material to its upper end and discharges to a 75-foot high storage pile. Capacity of the conveyor is 300 tons per hour. A 60-horse power motor powers the conveyor drive.

Novel feature of the Hewitt-Robins stacker is its mobility. Four electrically driven trucks move it on tracks extending the full length of the 800-foot storage area.

Piles 75 by 800 Feet

By using the apparatus, Coronet Phosphate has found that it is possible to make a phosphate storage pile 75 feet high and 800 feet long.

Steel reinforcements gird the stacker against the unusually high winds which sweep across the Plant City area of the state, according to the manufacturer.

The conveyor frame, which resembles a giant see-saw, is suspended on steel cables which make the structure appear from a distance somewhat like a suspension bridge. ◆

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A New Salesman

AT A fertilizer association meeting in June, a FARM CHEMICALS reader asked a staff member about a paragraph in our monthly roundup of the Washington scene "Farm Chemicals Outlook."

A fertilizer official, he wanted more information about a brief mention of a U.S.D.A. "departmentwide fertilizer sales plan." Our Washington correspondents advised readers to "watch for the decision of agricultural colleges and the Extension Service" on participating in the program.

The reader was favorably impressed by the new program. It sounded like an excellent idea. But what, he wanted to know, would be the position of the fertilizer industry in the new program? Would it be left out in the cold?

Subsequent revelations concerning the fertilizer sales program, officially called the U.S.D.A.-Land Grant Colleges Program for More Efficient Use of Fertilizer and Lime, showed that our questioner had little reason to be alarmed about the program.

Not only has the industry not been left out in the cold, it is scheduled to play one of the primary roles in showing farmers the very real advantages of using more fertilizer and using it more efficiently.

Impetus for the new program, of course, is the much discussed problem of getting more food for our rapidly expanding population—a population that may reach the 200,000,000 mark by 1975.

In announcing the program last month, Secretary of Agriculture Charles F. Brannan said "the Department and the Land-Grant Colleges and Universities have a joint responsibility for promoting the effective and proper use of fertilizer and lime. The ultimate best use of these elements will require an expanded long range program of research and education . . ."

In an outline of the organization of the drive, Paragraph 4 should be of interest to fertilizer personnel. It states "The continuing cooperation of the fertilizer and lime industries and other interests is invited to the end that industry activities will be coordinated with the National Fertilizer and Lime Utilization Program."

That the industry is ready to do just that was shown at the recent convention of the American Association of Fertilizer Control Officials in Washington. Both Russell Coleman and Paul T. Truitt, presidents respectively of the National Fertilizer Association and the American Plant Food Council, declared the support of their organizations for the program.

Coleman pointed out that fertilizer use still is less than half that recommended by the various states, and pointed out that the fertilizer potential is "the best source of wealth the country has."

Truitt said the program will give "every segment of agriculture an opportunity to cooperate," and outlined the following obligations of the fertilizer industry:

1. Produce enough fertilizer to reach the goals of the U.S.D.A. in meeting the needs of the increasing population.
2. Improve the quality of fertilizer.
3. Cooperate with the U.S.D.A. and the Land-Grant Colleges in coordinating the program.

SOME other noteworthy suggestions affecting the industry were included in a descriptive booklet from the U.S.D.A. outlining the scope of the program.

These included the sulfuric acid shortage and investigating means of overcoming the limiting effect it has on the production of superphosphate. The booklet also called for extensive research on the production of high-analysis mixed fertilizers with improved physical condition, suitable for year-round storage under both factory and farm programs.

The question of whether the farmer has the means of purchasing increased amounts of fertilizer obviously is an important factor in the drive, because without the ability to buy materials, or to get bank loans to buy them, the whole program would collapse.

That's where another big job is being done by the industry. By means of a special program set up last month by NFA, the organization is attempting to educate bankers to the important economics of fertilizer use and its vital relationship to farm income.

Improving the quantity and efficiency of fertilizer use will necessitate a strong educational program in addition to the obvious task of increasing production. The fertilizer industry has a vital interest in both jobs.

—HAMILTON C. CARSON

BETTER PASTURES

Thousands of farmers united in the Green Pastures program have found that planned pastures save feed and increase productivity of milk and meat.

As the leading producers of high grade red muriate of potash, we are proud our share in the fertilization of grasslands has helped to enrich American agriculture.

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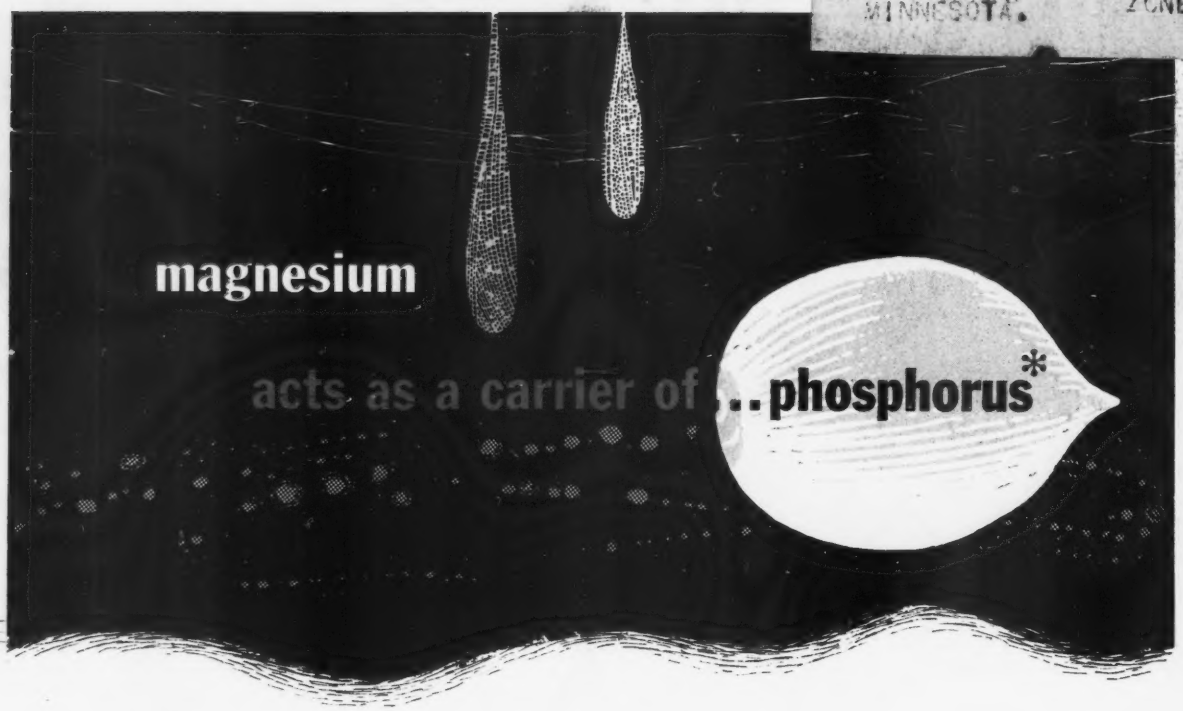

Include Soluble Magnesium in Your Quality Fertilizers

Sul-Po-Mag®

Water-Soluble
Double Sulfate of Potash-Magnesia

Magnesium is the basic metallic element in chlorophyll, the green plant substance which captures the sun's energy that is vital for life and growth.

Magnesium concentrates in the seed with phosphorus to aid in the formation of oils and proteins required for viable seed.

* Magnesium functions as a carrier of phosphates to the actively growing and fruiting parts of the plant.

Magnesium is required to activate the processes which stimulate the production and transport of carbohydrates and proteins within the growing plant.

Magnesium, in sufficient quantities, enables the plant to utilize other plant nutrients for healthy, disease-resistant growth.

Magnesium stimulates the growth of soil bacteria and increases the nitrogen-fixing power of legumes.

Research has demonstrated that there is a close relationship between phosphorus and magnesium in the life and growth of all plants. Magnesium appears to act as a "carrier" of phosphates within the plant, probably by the formation of soluble magnesium phosphate compounds. Poor response to phosphate fertilizers may be due to low magnesium in the soil. Therefore, in order that the growing and fruiting parts of the plant receive sufficient supplies of phosphorus, they must have an ample amount of soluble magnesium in addition to phosphate.

The most effective and convenient way for the farmer to supply an adequate amount of soluble magnesium to his growing crops is to use a fertilizer containing *Sul-Po-Mag*.

Sul-Po-Mag, produced exclusively by *International*, provides a properly balanced combination of sulfate of magnesium and sulfate of potash, water-soluble and immediately available to the growing plant. *International* supplies *Sul-Po-Mag* in bulk for use in mixed fertilizers and bagged for direct application.

Advertising of *Sul-Po-Mag* in full-color pages in *Country Gentleman* and in smaller space in state and sectional farm papers is stimulating the interest of farmers in quality fertilizers containing *Sul-Po-Mag*.

International Minerals & Chemical

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SULFATE OF POTASH
SUL-PO-MAG

Mined and Refined at Carlsbad by International for Fertilizer Manufacturers

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INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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